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R. D. FULK

THE ORIGINS OF INDO-EUROPEAN QUANTITATIVE ABLAUT

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to my parents

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PREFACE

The claim that the Indo-European protolanguage suffered a process of iterative syncope was advanced in the second chapter of my unpublished 1982 University of Iowa doctoral dissertation, 'Laryngeals and Germanic vocalism'. This book was originally intended to be a revised and expanded version of that dissertation chapter, though beyond the central claim that there was such a syncopic process, there is now very little resemblance between the two. It has in fact been necessary to discard most of my original beliefs about syncope.

In the preface to his *Origins of the Indo-European nominal inflection* (Innsbruck, 1985) R. S. P. Beekes indicates that he had not seen J. Haudry's *Préhistoire de la flexion nominale indo-européenne* before completing the first version of his own work. I regret very much that I saw neither Beekes' work nor Haudry's before the camera-ready copy of this book was completed, as these are works of considerable relevance to my own.

Two generous stipends from Indiana University contributed to the production of this book: a Summer Faculty Fellowship enabled me to bring the manuscript near to completion in 1984, and a smaller Grant in Aid of Research facilitated the production of camera-ready copy. The copy, which is here reduced to sixty-five percent of its original size, was produced on a 24-pin-head dot-matrix printer, using a font-generating software package created by SoftCraft, Inc., of Madison, Wisconsin.

For help and advice of various sorts I am indebted to W. Sidney Allen, Shaun Hughes, and Winfred P. Lehmann; and to a great many friends and colleagues at Indiana University, including Frank Banta, Mary A. Burgan, Fred Householder, Jeffrey Huntsman, Eugene Kintgen, C. H. and Dorothy van Schooneveld, Paul Strohm, and Albert Wertheim. I wish also to thank Professor Meid. What I owe to Al and Linda David, I won't say.

BLOOMINGTON, 1985 R.D.F.

INTRODUCTION

This book proposes to explain how quantitative ablaut (Abstufung) arose in the Indo-European protolanguage. At a stage of the protolanguage considerably anterior to the Proto-Indo-European reconstructed by the comparative method—i.e., the stage referred to as Pre-Indo-European—there was an iterative syncope rule that, in effect, deleted every second vowel in any given word. The assumption of syncope itself is not a matter of contention, since it is standard theory that quantitative ablaut is the product of some syncopic process. Rather, the innovative aspect of the theory advanced here is that it attempts to specify very precisely the form of the syncope rule involved. The real advantages to the theory are that it explains a number of perplexing inflectional irregularities of Proto-Indo-European; it demonstrates that the syncopic process generally assumed to have taken place was in fact very similar to a type of iterative syncope encountered in natural languages; and it shows how some IE morphologically-conditioned alternations, e.g. in the position of the accent in a given paradigm, may be traced to original phonological causes.

The first chapter is devoted to surveying what is known or surmised about the origins of quantitative ablaut, and then at the end of the chapter (§1.9) the hypothesis of a Pre-Indo-European iterative syncopic process is presented. The remainder of the book is then devoted to demonstrating the explanatory power of the theory by showing how it accounts for surface irregularities of PIE inflection: the second and third chapters concern the declension of the major stem classes of nouns and adjectives, while the fourth chapter concerns conjugation, though the discussion is limited almost entirely to the present and aorist systems, since these appear to be the only categories in the verb system that are archaic enough to have originated in the Pre-IE period. Neither the pronominal nor the numeral system is given individual attention here: the theory of iterative syncope perhaps sheds light on the development of both categories, but both have suffered so much analogical disruption at the dialectal level (as demonstrated, for example, by G. Schmidt 1978 and Szemerényi 1960) that discussion of these categories would inevitably lead far afield of the purpose of this book, which is not to account for ablaut in all inflectional categories, but to establish the validity of a particular theory of the origins of quantitative ablaut by demonstrating that it explains alternations in the most conservative inflectional categories.

Nor is qualitative ablaut (Abtönung) given serious attention in this book. Qualitative ablaut is generally believed to be of more recent origin than quantitative, so it is of marginal relevance to iterative syncope; and attention to the former would inevitably detract from the clarity of presentation in regard to the latter. And so qualitative alternations are for the most part ignored: in some instances in which all the comparative evidence suggests **o* rather than **e* in a PIE form, **o* has been reconstructed, but for the most part in PIE forms **e* is used without prejudice to actual quality, and may be taken to stand for any full-grade vowel. This is true even next to an *a*-coloring laryngeal consonant. Since qualitative ablaut is of no practical importance in this work, it has not been necessary to advance any claim about the number and natures of laryngeal consonants in Proto-Indo-European. It has in fact been advantageous on the practical grounds of notational clarity to leave the coloring effects of laryngeals unspecified, since this makes it possible to distinguish at a glance chronological stages in the development of the protolanguage: the symbol **a* is used to represent any vowel in Pre-Indo-European—as explained below (§1.9), this notation is not intended to imply that there was just one vowel in Pre-Indo-European, but that it is fruitless at this point to advance any claim about the quality or quantity of any vowel in the protolanguage before the application of syncope. On the other hand, every full-grade vowel in Proto-Indo-European reconstructions is given as **e* (or occasionally **o*), even if it stands next to an *a*-coloring laryngeal, as in Pre-IE **Háĝa-* > PIE **Heĝ-* > Lat. *agō* 'drive'. The **e* in the PIE form is not intended to imply that the vowel in the word was ever actually a mid front vowel; the vowel might in fact have been phonetically [a] long before the rise of ablaut alternations between **e* and **o*. Rather, **e* is merely a notational device, advantageous because at a glance it distinguishes a Proto-Indo-European form from a Pre-Indo-European one, and excludes attention to qualitative alternations.

The term *zero grade* in this work refers to absence of any vocalism, and *reduced grade* refers to any sort of vocalism between full grade and zero grade, such as the syllabicity of a syllabic consonant. The term *weak grade* comprises both zero and reduced grades.

CHAPTER ONE: THE NATURE AND ORIGIN OF PROTO-INDO-EUROPEAN SYLLABIC CONSONANTS

1.0. INTRODUCTION. The purpose of this chapter ultimately is to present a theory of the origin of quantitative ablaut alternations in Proto-Indo-European (§1.9). Prior to doing so, it will be useful to examine the strengths and weaknesses of the other theories that have been proposed (§§1.5–1.7), and to investigate a parallel in a natural language (§1.8). First, however, since theories of ablaut rely on disputed assumptions about PIE syllabic consonants, it will be necessary to review the major outlines of the controversy over the nature of PIE syllabic consonants and their position in the ablaut series.

1.1. THE SONANTENTHEORIE AND ITS OPPONENTS. Syllabic liquids were first reconstructed for Proto-Indo-European by Hermann Osthoff (1876:52–3), and syllabic nasals by Karl Brugmann (1876a: 303–4), on the authority of Eduard Sievers' observation (1876:24–5) that in different environments liquids and nasals can serve as both consonants and vowels. In the same year that he proposed the existence of PIE syllabic nasals, Brugmann (1876b) presented the first major outline of his theory of PIE vocalism, demonstrating that the Sanskrit vowel system has suffered extensive change in comparison to, for instance, the Greek.[1] Its integration into Brugmann's theory of PIE vocalism lent immediate plausibility to the reconstruction of syllabic liquids and nasals, a reconstruction that came to be known as the 'Sonantentheorie'. The position of the Sonantentheorie was solidified three years later by Ferdinand de Saussure (1879), whose theory of 'coefficients sonantiques' demonstrated surprising regularity in the PIE ablaut series *e/o/∅*—a theory well appreciated at the time, even before some of its more conjectural aspects were vindicated by the discovery of reflexes of laryngeal consonants in Hittite. To de Saussure's *Mémoire* is due also the practice of indicating the syllabicity of PIE liquids and nasals with a subscript circle (**r̥, *l̥, *m̥, *n̥*), and it is an effect of the authority of the Sonantentheorie that to the present day Indo-Europeanists employ the subscript circle to indicate syllabicity, while all other branches of phonology regard this notation as indicating voicelessness.[2]

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[1] Amelung (1871, cited by Szemerényi 1980:127) had suggested earlier that the Indic vowel system is innovative, but he had not demonstrated the point. He had also suggested (52ff.) that the appearance of an epenthetic vowel after loss of a full-grade vowel, especially in the

So solid is the authority of the Sonantentheorie today that the opposition it faced at first is now surprising. The controversy centered on whether the symbols **r̥, *l̥, *m̥, *n̥* ought to be taken at face value, or whether it would be better to assume that a syllabic resonant consists of a sonorant consonant accompanied by a syllabic peak, which would best be represented by some such notation as *$_e r$, *$_e l$, *$_e m$, and *$_e n$, or the like. The latter was the view of Johannes Schmidt, whose initial rejection of Brugmann's claims (J. Schmidt 1877; 1889:218) grew later to a book-length effort, *Kritik der Sonantentheorie* (1895), that marked him as the Sonantentheorie's chief opponent, along with Fritz Bechtel (1892:127–43, and esp. 151–3). Others who rejected **r̥, *l̥, *m̥*, and **n̥* included Schmidt-Wartenberg (1896), Jagić (1887:189), Fortunatov (1888:569–73), Mahlow (1888:6), and Kögel (1882).

These critics of the Sonantentheorie were hardly in agreement with one another, and in general their views would

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environment of a resonant, would account for the appearance of *u* in the normal ablaut series in Germanic; and so he anticipated Osthoff and Brugmann in accounting for the phenomena for which they posited syllabic liquids and nasals.

[2] Sievers, Osthoff, and Brugmann had theretofore used underscoring to indicate syllabicity. De Saussure was relying on a precedent set by G. J. Ascoli (de Saussure 1879:6n.).

not today bear much scrutiny. The one assumption these scholars did share was that PIE interconsonantal *r̥, *l̥, *m̥, and *n̥ are not accurate representations, and that is an objection to which Brugmann conceded a certain amount of theoretical legitimacy. Nonetheless, it is clear that Brugmann's chief concern was not with descriptive accuracy, but with descriptive adequacy—a distinction that reveals an understanding, well in advance of his critics' understanding, of what has come to be linguistic metatheory. The distinction surfaces in Brugmann's own review of Schmidt's book (Brugmann 1895). After rejecting Schmidt's evidence for *$_e$r, *$_e$l, *$_e$m, and *$_e$n, Brugmann remarks that one has perhaps after all to concede the existence of such in Proto-Indo-European, side by side with *r̥, *l̥, *m̥, and *n̥, and that the two series very probably represent tempo variants, the former in lento speech and the latter in allegro. However, he concludes, Schmidt's notation captures too subtle distinctions ('Finessen', in this instance referring to performance variations), and Brugmann's own notation is more useful.[3]

Why his notation is more useful, Brugmann does not say, but reasons can readily be supplied. If Schmidt's notation does not explain any facts that Brugmann's cannot, then Schmidt's is inferior because it is hyperanalytic (i.e. overly phonetic), and so is less likely than Brugmann's to capture important generalizations. The valuable generalization that must have been most important in Brugmann's view was the congruence de Saussure had demonstrated between the behavior of the semivowels and the other sonorants. The notation _r/r̥_, _l/l̥_, _m/m̥_, and _n/n̥_ captures particularly well the affinity between these alternations and the alternations of _y_ with _i_, and _w_ with _u_, in a way that the notation _r/_$_e$_r_, _l/_$_e$_l_, _m/_$_e$_m_ and _n/_$_e$_n_ does not. Brugmann's notation has largely prevailed in the representation of PIE interconsonantal syllabic resonants. Controversy remains, however, about the representation of antevocalic syllabic resonants, and of nonresonant syllabic consonants, i.e. laryngeals.

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[3] 'Ja man kann, auch wenn man sich durch S.'s Beweisführung ganz und gar nicht überzeugt fühlt, ihm doch ein Stück Weges entgegenkommen, man muss es sogar vielleicht. Formen wie _*t^{e}ntós_ und _*tn̥tós_, _*g^{e}rús_ und _*gr̥rús_ (_*gr̥^{r}ús_) sind in Wirklichkeit nicht in dem Masse verschieden, wie es auf dem Papier erscheinen kann. Alle Artikulationen haben in Folge der vom Sinn der Rede und von Stimmung abhängigen Verschiedenheit des Sprechtempos u. dgl. stets einen gewissen Spielraum. Namentlich gilt das für die Ueberführung der Sprechwerkzeuge aus der festen Stellung für einen Laut in die feste Stellung für einen andern. So ist es sehr gut möglich, dass in uridg. Zeit _^{e}n_, _^{e}r_ und _n̥_, _r̥_ und allerlei Zwischenstufen zwischen diesen neben einander gesprochen wurden, wozu es deutliche Parallelen in den modernen Dialekten giebt. Man könnte summarisch z.B. _*t^{e}ntós_, _*g^{e}rús_ als die Formen des langsamen Tempos (Lentoformen), _*tn̥tós_, _*gr̥rús_ als die der lebhafteren Rede (Allegroformen) bezeichnen. Auch mag sein, dass je nach der Natur der umgebenden Konsonanten ein ^{e} sich bald leichter, bald weniger leicht entstellte. Das sind aber Dinge, die nicht mehr zu controlieren sind, und für die graphische Darstellung der idg. Grundformen, bei der begreiflicher Weise auf solche Finessen für gewöhnlich keine Rücksicht genommen werden kann, empfiehlt sich _n̥_, _r̥_ mehr als _^{e}n_, _^{e}r_' (Brugmann 1895:1726-7).

1.2. CONTROVERSY OVER ANTEVOCALIC SYLLABIC RESONANTS. Because they advocated a notation that would express clearly the essential unity in the syllabic/nonsyllabic alternation of all the PIE sonorant consonants, the 'Sonantiker' (Johannes Schmidt's term for adherents of the Sonantentheorie [1895:45]) were inevitably led to an assumption less widely accepted. When Osthoff (1879a:421; 1879b:14–16n.) discovered the existence of PIE antevocalic syllabic liquids and nasals, he did not hesitate to represent them as syllabic resonant + homorganic nonsyllabic resonant (in de Saussure's notation, _*r̥r_, _*l̥l_, _*m̥m_, _*n̥n_—cf. de Saussure 1879:257–9). Brugmann (1879: 155) seems to have had some initial doubts about the best way to represent these sounds, but within a short time he came to be the foremost champion of the _R̥R_ notation. A number of reasons suggest themselves for this notation, but the consideration that was weightiest in Osthoff's decision was probably once again the desire to maintain continuity with the alternations of the semivowels. Because in Sanskrit anteconsonantal _i_ and _u_ alternate with antevocalic _iy_ and _uv_, it makes sense to reconstruct PIE antevocalic _*r̥r_, _*l̥l_, _*m̥m_, _*n̥n_, as well (rather than, say, _*_$_e$_r_, _*_$_e$_l_, _*_$_e$_m_, _*_$_e$_n_).

While opposition to the notation _*r̥_, _*l̥_, _*m̥_, _*n̥_ was relatively minor and isolated, objections to _*r̥r_, _*l̥l_, _*m̥m_, _*n̥n_ proved numerous and persistent. In fact, proponents of the latter notation seem to have been in the minority for at least the first half century after Osthoff and Brugmann's initial studies, while the list of opponents is long. Indo-Europeanists advocating some such notation as antevocalic *ьR*, *°R*, or *ₑR* (that is, a consonantal resonant with a preceding syllabic peak referred to as the reduced vowel, the anaptyctic vowel, or schwa secundum) include Kretschmer (1892; 1893), Hirt (1921–37), Walde and Pokorny (1927–32), Meillet (1937), Prokosch (1938), and E. Sturtevant (1942). In the last few decades the majority opinion seems to have shifted. Some fundamental works in Indo-European linguistics still reject de Saussure's notation (see, e.g., Pokorny 1959, Lejeune 1972, and Szemerényi 1980:44–5), but the notation *R̥R* seems now to predominate. This change of attitude is largely due to the findings of Franklin Edgerton in regard to Sievers' law and the distribution of resonant allophones in Vedic Sanskrit.

1.3. SIEVERS' LAW AND PIE ANTEVOCALIC SYLLABIC LIQUIDS AND NASALS. The essential claim of Sievers' law is that PIE antevocalic resonants are syllabic after heavy syllables and nonsyllabic after light. Sievers (1878:129) supported this contention with evidence from Indic and Gothic—e.g., to use the most frequently cited examples, Gothic masculine *ja*-stem nouns have *-jis* in the genitive singular after light syllables (as in *harjis* 'army's' < **koryes[y]o*), and *-eis* after heavy (as in *hairdeis* 'shepherd's' < **k̂erdhiyes[y]o* < **k̂erdh* + *yes[y]o*). Since Sievers' time the law has generated considerable controversy, particularly because of the subsequent introduction of sometimes recalcitrant evidence from other IE languages, and because of the need to account for various exceptions in Vedic, some of which Sievers himself pointed out. For a concise history of discussion of Sievers' law see Horowitz (1974:11–38); and, at greater length, Seebold (1972:25–133).

It was Franklin Edgerton (1934; 1943; 1962) who, more than anyone else, lent Sievers' law the character of a Neogrammarian sound law, by setting out to prove it regular and exceptionless. The impact of Edgerton's work has been such that his name is added almost automatically in reference to the law, e.g. 'Sievers' law as restated by Edgerton' (E. Sturtevant 1943:310), 'Sievers' law in Edgerton's formulation' (Lehmann 1955:355), 'Sievers-Edgerton's law' (Brosman 1957:4), and 'the Sievers-Edgerton description of the IE sonants' (Keiler 1970:74). Edgerton's studies led him to the conclusion that the alternations between syllabic and nonsyllabic allophones of the resonants were conditioned solely on a phonological basis in Proto-Indo-European, and that the conditioning is still largely phonological in the language of the Rigveda, though even there the alternations have come to be regulated in part by morphological considerations. The phonological rule Edgerton establishes is the same as Sievers', but he has worked out the details in regard to various combinations of sonorants, and provided evidence for these patterns in the Rigveda. The patterns may be schematized as in Table 1.3, where *a* = any short vowel; *t* = any consonant; *k* = any second consonant; *#* = a word boundary in pausa; *y*, *i*, *iy* = the

one resonant:				
	tit	*#it*	*ti#*	
	aya	*#ya*	*ay#*	
	ayt			
	atya	but **ktiya, ātiya*		*#tiya*
two resonants:				
	aywa	but *āyuwa*		
	atyut	*atyu#*	but *ātiyut*	*ātiyu#*
			ktiyut	*ktiyu#*
			#tiyut	*#tiyu#*
	#yut			
	ayut	*ayu#*		
	#tiwa	*ātiwa*	*ktiwa*	
	atyuwa			
	either *yuwa* or possibly *iwa*; pattern uncertain			
three resonants:				
	aywit	*aywi#*	*aywiya*	

Table 1.3. Allophonic variation in the PIE resonants, as posited by Edgerton (1943).

allophones of any resonant; and *w*, *u*, *uw* = the allophones of any second resonant (after Lehmann 1952:10–1).

What Edgerton himself considered his 'most important new discovery' (1943:87) was a phenomenon he termed the 'converse of Sievers' Law'. Not only do antevocalic resonants become syllabic after heavy syllables (*ak* + *tya* > *aktiya*), but syllabic resonants lose their syllabicity after light syllables: e.g., if *k* is lost in *aktiya*, the result is *atya*, not **atiya*. It has been pointed out (e.g. by Beekes 1976:89) that it is misleading to call such a loss the 'converse of Sievers' Law', since that loss is already a claim of the law under Sievers' own formulation of it. However, the term 'converse' continues to be used in the extensive discussion of the problem, since it is convenient to distinguish the controversial deletion of syllabicity from its addition.

The real importance of Edgerton's arguments in the present context is that among his data in defense of the converse of Sievers' law he presents important evidence against representing antevocalic syllabic resonants as *ₑR* rather than *R̥R*. One of his pieces of evidence for the converse is as follows (1943:87–8):

> The RV has two 3 pl. perfect middle forms *cakre* 10.90.8 and *dadhre* 10.82.5. There is no doubt whatever that they are derived from the reduplicated stems *cakr-* and *dadhr-* plus the ending *-re*. Since the preceding syllable (*ca-*, *da-*) was light, the phonetically regular result had to be *cakre*, *dadhre*, not **cakr̥re* (which would have yielded **cakire*). The circumstance that these forms were homonymous with the 3 singular naturally favored creation of the analogical new forms *cakrire* and *dadhrire*. That forms like *cakre*, *dadhre* must have once been in rather extensive use, by the side of the analogical *cakrire*, *dadhrire*, seems to me made at least highly probable by the fact that the RV has a number of 3 pl. forms in *-rire*, from roots which did not contain *r*: *cikitrire*, *jagr̥bhrire*, *dadrire* (root *dā*), *bubhujrire*, *vividrire*, *sasr̥jrire*. I can only understand these as analogical to *cikitrire* etc. (3 pl., to 3 sg. *cikite* etc.) on the pattern *cakre* : *cakrire* (both 3 pl.).

In a footnote he remarks, 'These forms are specially important because they effectively dispose of the now fashionable theory that instead of *iy*, *uw*, *r̥r* etc. we should assume *ъy*, *ъw*, *ъr* etc., with 'shwa secundum' instead of the syllabic semivowel before homorganic non-syllabic semivowel.' The converse of

Sievers' law disproves the existence of *ər* because this could not 'furnish the model for a substitution of *-r-* for *-r̥r-*' (1943:88 n. 14). Despite some counterarguments raised by E. Sturtevant,[4] Edgerton's refutation of Hirt's *ər* notation seems to have acquired a degree of authority: see, e.g., Keiler 1970:80.

Edgerton's disproof of antevocalic *ər* faces some difficulties. His assumption is that /cakr + re/ would yield **cakr̥re*, which, by the converse of Sievers' law, would be converted to *cakre*. However, it does not seem to have been pointed out, the intermediate stage **cakr̥re* can itself only be an analogical creation. According to Edgerton's findings, in a sequence /atywa/ it is the second resonant that is syllabic, not the first. In other words, under Edgerton's formulation of Sievers' law *atyuwa* is to be expected, not ***atiwa*, as in Table 1.2. Therefore /cakrre/ should not give **cakr̥re*, but **cakrr̥re* (that is, *cakr* + *r̥* + *e*), which would make *cakrire* the inherited form.[5] Edgerton's derivation of *cakre* by reduction of **r̥r* to *r* in **cakr̥* + *re* assumes that the syllabicity of the latter is morphologically conditioned. And in fact it is true that the syllabicity of the stem-final *r* is morphologically determined throughout this perfect paradigm. The rule for syllabicity assignment here seems to be that the stem-final *r* is always syllabic unless the following morpheme begins with a vowel: cf. 1. pl. act. *cakr̥má* and perf. act. part. *cakr̥vā́ṁs-*, rather than the **cakramá* (<**cakrm̥má*) and **cakruvā́ṁs-* to be expected if the syllabicity had the phonological conditioning Edgerton attributes to Proto-Indo-European. That syllabic *r̥* in these forms is due to paradigm regularization is also the opinion of Brugmann (1897–1916:1.1.458; and see below, §1.4). Since morphological conditioning must be assumed in order for Edgerton's derivation of *cakre* from **cakr̥re* to be valid, it seems hard to justify using the same form as evidence of phonological conditioning—in other words, it is difficult to see the value of this form as evidence for the converse of Sievers' law when it violates Sievers' law, itself.

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[4] Sturtevant explains *cakre* as an innovation, since an analogical proportion such as 'midd. 3 sg. *vivide* : *cakre* = (midd. 3 pl.) *vividre* : *x* would induce a 3 pl. **cakrre*, with long *r*; and in a language that did not tolerate long consonants in consonant clusters the long *r* would no doubt be shortened, yielding *cakre*' (1943:312–3). An even likelier possibility, he suggests, is that *cakre* is a reduction of *cakrire* by haplology, instances of which are known in Vedic. Horowitz (1974:42) approves Sturtevant's explanations, repeating them almost verbatim. I am dissatisfied with these arguments because their intent is to explain the existence of *cakre* without accounting for the nonexistence of **cakr̥re*, a form that the rest of the paradigm leads one to expect. The morphological rule regulating the syllabicity of stem-final *r* in this paradigm, discussed below, demands this form, and certainly would have created such a form, if it did not already exist. One can only imagine that **cakr̥re* did at one time exist, and that either *cakrire* or *cakre* (or both) is the regular phonological development of it.

[5] Perhaps the most improbable of Edgerton's claims about this word is that the hapax legomenon *cakre* is the phonologically regular form, while normal *cakrire* is analogical (presumably to *paptire* and the like). One difficulty is that *cakrire* has an exact cognate in Younger Avestan *čāxrare*, while there is no Avestan parallel to *cakre*; and yet Edgerton attributes *čāxrare* to analogy, as well (1943:88 n. 14). Unfortunately,

Moreover, reexamination of the Rigvedic material has disclosed considerable counterevidence to Edgerton's claims. That there is no converse of Sievers' law operative in the language of the Rigveda is the conclusion of three book-length studies of the syllabic alternations of resonants in Vedic: see Sihler 1967 (also 1969 and 1971), Seebold 1972, and Horowitz 1974. Seebold's work is of particular importance for its thorough treatment of this enormous body of material. A striking example of a category in which no converse has applied is the *vr̥kī*-type of *ī*-stem noun, in which stem-final *-y-* is always syllabic (*-iy-*) before an ending that begins with a vowel, regardless of whether the preceding syllable is long or short (Seebold 1972:184). There are just three exceptions in approximately 150 instances in the Rigveda. Seebold concludes

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čāxrare is the only 3. pl. middle form of the perfect attested in Avestan, and so it is not possible to say what it might be modeled after on the basis of analogy. The Avestan evidence more readily lends itself to supporting the view that Vedic *cakrire* is the regular reflex of **cakr̥re* (a form it is hard to suppose did not exist: see n. 3 above), while *cakre* may be due to any number of causes, such as haplology (n. 3 above); or it may be the reflex of a form in existence prior to the **cakr̥re* induced by morphological conditioning of resonant syllabicity in the perfect (see below).

that syllabicity is automatic in the semivowels *y* and *w* after heavy syllables, while the syllabic and nonsyllabic forms are in phonemic contrast after light syllables. Such a meaningful contrast rules out the possibility of an allophonic converse of Sievers' law, and so only the law itself remains intact, the rule that induces syllabicity after heavy syllables, which Seebold calls the 'Anschlussregel'. But even the Anschlussregel itself is rather irregular: in the *devī*-type of *ī*-stem noun, the stem-final *-y-* is nonsyllabic after a heavy syllable in about a quarter of the Rigvedic instances (pp. 184-7).

In sum, then, despite Edgerton's claims, Vedic *cakre* demonstrates nothing about Sievers' law or its converse, and so nothing about the phonetic value of antevocalic *r̥* in Proto-Indo-European. There is then no compelling reason on this basis to prefer the notation **r̥r* to Hirt's **ъr*, Meillet's *°*r*, Kuryłowicz' *${}_{e}r$, etc.

1.4. SYLLABIC LARYNGEALS. The Sonantentheorie was once again challenged by Jerzy Kuryłowicz' identification (1927a) of certain of de Saussure's 'coefficients sonantiques' with Hittite *ḫ(ḫ)*. It was apparent from the outset that the laryngeals could not be sonorants, but were most likely spirants, and that is still general opinion. This phonetic probability raised doubts about the nature of syllabic laryngeals. Then as now, those who saw nothing improbable in the notation **r̥*, **l̥*, **m̥*, **n̥* tended to balk at such an abstraction as **H̥*. Kuryłowicz remarks, 'Si l'on admet que *ə̨* possède une aperture plus petite que celle d'une sonnante, il est évidemment difficile d'expliquer *ə* (indoir. *i* = eur. *a*) par la vocalisation de *ə̨*' (1927b:233). Likewise Szemerényi, whose views on laryngeals may justly be characterized as cautious, comments, 'Nur wenige sehen keine Schwierigkeit in der Annahme, dass der Laryngal, auch wenn er als ein Spirant bestimmt wird, silbische Funktion übernehmen könne' (1980:122). Accordingly, Kuryłowicz at the outset analyzed Brugmann's **ə* between consonants as a laryngeal consonant with an accompanying 'voyelle anaptyctique'.

It should be pointed out that there is nothing phonetically improbable about analyzing **ə* as *${}_{e}H/H_{e}$. Grammont (1965:103) remarks about syllabic consonants in general,

> On parle souvent, sur le modèle des grammairiens de l'Inde, d'un *r* voyelle, d'un *l* voyelle, d'un *n* ou d'un *m* voyelle. Ce ne sont pas plus de voyelles que l'*s* de *pst* vu plus haut. Le point vocalique est tantôt avant tantôt après, selon que ces phonèmes sont croissants ou décroissants, et s'ils développent une voyelle c'est tantôt avant tantôt après, conformement à la position du point vocalique. Le plus souvent ils sont décroissant, avec le point vocalique devant. C'est le cas pour l'*l* ou l'*n* anglais en syllabe finale inaccentuée: *littl(e)*, *mant(e)l*, *weak(e)n*, *crims(o)n*, pour l'*l*, *r*, *n* allemands en syllabe finale inaccentuée: *mant(e)l*, *mutt(e)r*, *red(e)n*, pour l'*r* de *Srbiya*, pour l'*l* de *Blgariya*.

The necessity of analyzing at least some syllabic consonants into phonetically discrete syllabic and nonsyllabic portions is urged by Hoard (1978, in accordance with Bell 1978), who finds that in the syllabic stops and affricates of some native American languages, the syllabic peak does not coincide with the segment peak: 'Phonetically, a syllabic voiceless stop consists of a stop portion followed by a release.... The syllabic peak of syllables consisting solely of a syllabic stop is in the release, not in the stop portion' (p. 68). He points out that these segments raise difficulties for generative theory, since the two portions of the segment carry contradictory values for the feature [syllabic]. The stop portion has the value [– syllabic], while the release portion is [+ syllabic], meaning that theoretically the distinctive feature matrix of a single segment ought to show contradictory values at one and the same time! Hoard's solution to the problem is to represent such segments formally as feature matrices with more than one column. This may or may not be a viable solution, but it does accord well with the elementary fact that articulations are temporal acts, and the articulatory properties of a segment are not invariable throughout any articulation—a fact well demonstrated by affricates and some consonants with secondary articulations, such as voiceless aspirates.

And so Hoard's observations demonstrate that the representation of syllabic laryngeals as $^{*}{}_{e}H/H_{e}$ cannot be discounted on the grounds of phonetic improbability. Syllabic consonants of this form do occur in natural languages, a fact that must be regarded as a conclusive response to Keiler's objection that under the reduced-vowel analysis 'the sonority feature of the semivowels is never at stake', when in truth 'the IE sonants functioned both syllabically and non-syllabically by virtue of their special sonority feature' (1970:79–80). The point Keiler wants to establish is that the sonorants (and the laryngeals) are intrinsically different from other consonants—because of their sonority they may be syllabic in Proto-Indo-European, while oral stops never are. Therefore the notation $^*{}_{e}H/H_{e}$ is inferior because it fails to capture the generalization that the syllabicity of the consonant is due to an inherent property of the consonant—sonority. This is not sound reasoning. It is true that resonants and fricatives are different from oral stops in respect to sonority, but the difference is one of degree, not an absolute difference. Even generative phonologists who employ binary valuation for classificatory features acknowledge that phonetic features are multivalued—see, e.g., Chomsky and Halle (1968:65). Likewise the sonority of the resonants and fricatives is not uniform, resonants having greater aperture than fricatives, [j] and [w] having greater aperture than [r], etc. The greater aperture of resonants and laryngeals is undeniably related to the historical fact that only these segments function as syllabic consonants in Proto-Indo-European, but that is still a historical fact rather than a linguistic universal, and which consonants may be syllabic varies considerably from language to language among those that have syllabic consonants. To insist, then, that the sonority feature of PIE syllabic consonants must be 'at stake' is to assume that the group of syllabic consonants reconstructed for Proto-Indo-European is the only one possible in a natural language. The argument is in fact self-defeating, since Keiler's ultimate purpose is to argue against the notation $^*{}_{e}H/H_{e}$, even though $^*H$ was not a sonorant.

Some Indo-Europeanists reject $^*{}_{e}H/H_{e}$ on phonemic rather than phonetic grounds, since they do not recognize the existence of reduced vowels. It is true that some frankly untenable claims have been made about PIE reduced vowels, but not all views on the subject are entirely improbable. At this point it will be useful to review the general outlines of the controversy over PIE reduced vowels. This review will serve not only to clarify Kuryłowicz' position, mentioned at the outset of this section, but also to introduce the most fundamental issues relevant to the problem of the origins of quantitative ablaut.

1.5. THEORIES OF PIE REDUCED VOWELS. It is consensus opinion that at one time PIE words contained more vowels than it is possible to reconstruct for them solely on the basis of the comparative method. If verbal roots generally display a full-grade vowel in the present indicative active singular, but not in the past passive participle (e.g. PIE **der-* in Gk. δέρω, δείρω 'flay', but **dr̥-* in δαρτός, δρατός 'flayed' = Skt. *dr̥táḥ* 'torn, burst'), the reason for the discrepancy presumably is that at some point in the development of Proto-Indo-European a full-grade vowel in the participle was reduced or lost. Accordingly, it is standard theory that Proto-Indo-European passed through a stage in which there was widespread reduction and syncope of vowels in syllables without stress accent. This has in fact been consensus opinion since Brugmann (1897–1916:1.2.946; see also, e.g., Lehmann 1952:112–4; and Kuryłowicz 1968:29 et passim) proposed that there had been two different types of accent at different stages in the development of the IE protolanguage. The evidence of the attested IE languages points to the conclusion that at the latest reconstructible stage of the protolanguage the accent was a pitch accent, but all the evidence indicates that the accent had earlier been a stress accent. There is no other convincing way to account for the existence of PIE syllabic consonants, and of quantitative ablaut alternations. Such phenomena are in natural languages associated with the kind of reduction and loss of vowels that is found on such a large scale only in the unstressed syllables of languages with stress accent.

Moreover, the relationship between the reduction and loss of vowels and absence of stress in Proto-Indo-European is attested by a discernible relationship between quantitative ablaut alternations and the position of the accent. So for instance the Greek forms nom. sg. πατήρ 'father', acc. πατέρα, gen. πατρός, dat. πατρί point to PIE **pH̥tḗr*, **pH̥tér-m̥*, **pH̥tr-ós*, (loc.) **pH̥tr-í*, demonstrating a general correspondence between the place of the accent and the ablaut grade of the stem. So also in conjugation, Skt. 1. sg. pres. act. indic. *yunáj-mi* 'join', 2. *yunák-ṣi*, 3. *yunák-ti*, 1. pl. *yuñj-máḥ*, 2. *yuñk-thá*, 3. *yuñj-ánti* also show that the full-grade vowel of the stem disappears when the accent shifts to the desinence, and, contrariwise, the desinence is in weak grade when the stem is accented. It is true that there are many exceptions to this regularity—e.g., the PIE word for 'wolf', generally reconstructed as **wl̥kʷos*, is apparent counterevidence, with an accented syllable in weak grade. But such exceptions are to be expected, since the conversion of the PIE stress accent to pitch accent removed any phonological basis for the connection between accent and quantitative ablaut, and subsequent shifts in the position of the accent would not disturb the original quantitative alternations. The existence of exceptions is not reason to abandon the assumption of a direct connection between accent and ablaut; rather, the relationship between the place of the accent and the ablaut grade in paradigms like those of πατήρ and *yunájmi* is obviously too regular to be coincidental, and so the existence of exceptions like **wl̥kʷos* calls instead for explanation why the pitch accent should have shifted in the exceptional forms. In many instances there are in fact recoverable reasons for such shifts, and one of the objects of the following chapters is to search out those reasons. Moreover, the typology of natural languages argues against dissociating accent and ablaut, since such widespread vowel reduction does not occur naturally in stressed syllables, and the source of the syllabicity of syllabic consonants is, in the vast majority of instances, syncope. Alan Bell, after examining eighty-five languages with syllabic consonants, goes so far as to state categorically, 'The syllabicity of syllabic consonants never arises spontaneously from a marginal consonant [that is, a consonant that is not adjacent to a syllable peak], as far as I can tell. The source of the syllabicity is always a vowel' (1978:165). And although this conclusion probably ought to be taken *cum grano salis*—I think there are undeniable exceptions, e.g. Modern Icelandic *hestur* 'horse' from monosyllabic OIcel. *hestr*—it at least serves as evidence that syncope is by far the commoner source of syllabicity in syllabic consonants.

And so PIE syllabic resonants historically reflect consonantal resonants with accompanying vowels that were reduced because they were unstressed. Note that these historical observations offer no assurances about the phonetic values of syllabic resonants at the close of the PIE period. It may well be that $*{}_{e}R$ and $*R_{e}$ changed to Brugmann's *R̥ in the course of the development of Proto-Indo-European, or it may be, as Schmidt and Bechtel insist, that *r̥* is purely an Indic development from PIE $*{}_{e}r$ (or $*r_{e}$). No matter what is assumed about the phonetics of PIE syllabic resonants, phonemically it ought to amount to the same thing: reduced vowels lost their phonemic status whenever *r̥ or $*{}_{e}r/*r_{e}$ achieved allophonic status. These unstressed vowels must have been phonemes before they were reduced to [ə], but regardless of whether or not they maintained any separate phonetic identity, they certainly lost their phonemic identity when they combined with resonants to produce syllabic allophones of those consonants.

It has been the contention of several Indo-Europeanists that these reduced vowels under some circumstances did maintain a separate phonemic identity. So for instance E. Sturtevant (1942:90) regards this vowel (*ъ in his notation, and referred to as 'schwa secundum') as a discrete phoneme in the PIE inventory, and Hirt (1921–37:2.91–5) proceeds from the assumption that a synchronic distinction between reduced and zero grades in otherwise identical environments can be predicted on the basis of the position of the accent. Both of these scholars' claims are objectionable because they assume the synchronic coexistence of syllabic resonants and interconsonantal nonsyllabic resonants with accompanying phonemic *ъ. For instance, Sturtevant derives Lat. *sarpō* 'prune, trim' from *sъrpō (1943:304), while presumably *fors* 'chance, luck' ought to come from *bhr̥ts. Hirt offers several pages of examples of *TъRT* beside *TR̥T*. These analyses undercut the very historical consideration which alone can justify assuming the existence of reduced vowels—the existence of syllabic resonants, due to reduction of unstressed vowels. Were it not for the existence of syllabic resonants, certainly the idea of an intermediate state between full and zero grades would never have suggested itself. But it is clear that Hirt and Sturtevant regard *-TR̥T-* as zero grade rather than reduced grade—i.e., they regard it as parallel to *-TT-* in the series *-TeT-* (full), *-TъT-* (reduced), *-TT-* (zero), when, on the basis of the general opinion among Indo-Europeanists that PIE syllabic consonants result from syncope, historically *-TR̥T-* should be considered parallel to *-TъT-*. The association of *-TR̥T-* with zero grade has been a persistent impediment in Indo-European phonology to understanding the origins of Abstufung. It is of course true that at the latest reconstructible stage of the protolanguage there is no phonemic distinction between *-TR̥T-* and *-TRT-*, since the latter does not exist. Synchronically one might say that *R* is automatically vocalized in this environment, but such an analysis is typologically less natural, given the general likelihood of Bell's conclusion that historically the syllabicity of syllabic consonants (at least usually) does not arise spontaneously from marginal consonants. The nonexistence of *-TRT-* is then due not to the spontaneous vocalization of *R* in this environment, but to the elimination of *-TRT-*, if it ever did exist, by reduction of the cluster. There is in fact a certain amount of evidence that consonant sequences of the form *-TRT-*, with nonsyllabic *R*, did at one time exist, in early Proto-Indo-European, before *$_e$ lost its phonemic status and the syllabicity of resonants came to be regulated purely on the basis of phonological environment—e.g., Vedic instr. sg. *áśnā* appears to reflect PIE **Heḱmneh*; and Vedic *budhnáḥ*, OE *botm*, Gk. πύνδαξ, Lat. *fundus* 'bottom' (the latter two with metathesis), in comparison to Gk. πυθμήν 'bottom', point to PIE **bhudmno-*. How such forms ever arose is explained below (§3.2.2). If, then, there was historically a phonemic distinction between reduced and zero grades it was eliminated by the time of late Proto-Indo-European; and Sturtevant and Hirt's association of *-TR̥T-* with zero grade rather than reduced is improbable on historical grounds.

Claims for the separate phonemic identity of *ъ at the close of the PIE period rest on the body of material pointing to distinct reflexes of *ъ in the IE languages. However, the body of evidence is small and, for the most part, debatable on etymological grounds, while the body of counterexamples is enormous. There are, admittedly, genuine puzzles such as the *a* in Lat. *quattuor* 'four' and *pandō* 'spread out', and the *u* in OHG *zweinzug*, OIcel. *tuttugu* 'twenty', but such apparent reflexes of *ъ are few and isolated, while in the vast majority of instances in which a reflex of PIE *ъ ought to be expected, instead a reflex of a full-grade vowel is found. For example, in preterite passive participles full grade is not normal in the stem (cf. δρατός above), and therefore the pret. pass. participle of the PIE root **pek*^{w}- 'cook' ought to be **pъk*^{w}*-tos*. Instead only forms with full grade of the stem are reflected:

Gk. πεπτός and Lat. *coctus*; and cf. Rigvedic *paktíḥ* 'cooked dish', where weak grade is also expected. So also the root **sed-* normally shows full grade in the participle, e.g. in Skt. *sattáḥ*, Lat. *obsessus*, and related forms. Likewise in the weak cases of a root such as PIE **ped-/*pod-* 'foot' there should be reduction of the root vowel; but in fact only full-grade forms of the uncompounded stem are attested. It is necessary to conclude that if forms such as these ever did contain reduced vowels (and it is difficult to suppose they did not, given the vowel reduction attested by similar forms containing resonants in the root), then some regular process has dictated the replacement of the reduced vowels by full-grade ones. This has also been a common assumption: Brugmann, for instance, remarks, '*e* bei Geräuschlauten wurde irgendwie reduziert, ohne dass die Silbe verloren ging (wir schreiben $_e$; nach Hirt war es stimmloses *e*). Es fiel aber mit dem intakten *e* wieder zusammen' (1904:141). Moreover, given the regularity with which full grade appears for expected schwa secundum between obstruents, it is all but certain that the replacement was effected in Proto-Indo-European itself.

These observations point to the elimination of the phonemic status of the reduced vowel before the end of the PIE period. The autonomy of the reduced vowel became severely restricted when the vowel lost its phonemic status next to a resonant, combining with the resonant to form a syllabic consonant. Then it should not be surprising if the remaining reduced vowels, those which could not be attached to a resonant, as in **pъk*^{w}- and *pъd-*, regularly developed to full-grade vowels in Proto-Indo-European (as argued below, §1.9). Apparent reflexes of **ъ*, as in Lat. *pando*, Gk. πίτνημι, might then be of more recent origin, a view for which some evidence is presented below (§4.3.1).

In contrast to advocates of the schwa secundum theory are those who do not grant reduced vowels phonemic status, but regard PIE *$_{e}H$ and *H_{e} as unitary segments. Hoenigswald (1953; 1960:134; 1965:97–9) has constructed a theory of PIE weak-grade vocalism that relies on the analysis of all PIE syllabic consonants into nonsyllabic segments with accompanying nonphonemic reduced vowels. Here the reduced vowel appears automatically in statable environments, for the purpose of breaking up consonant clusters. He posits

> a non-phonemic syllabic (vocoidal) segment making its appearance automatically between consonants after every sequence of two consonants (. . . CC$_e$CC$_e$C . . .), with pause (but not 'word-boundary') possibly functioning like a consonant. For instance, $_{e}y$ before a vowel appears as '(. . . akt)iy(a . . .)', while before consonant $_{e}y$ and y_{e} both merge into 'i'. In Greek, however, some of the semivowels retain the difference: $_{e}r$ (phonemically '(. . . akt)r(t . . .)') yields αρ (ορ), while r_{e} ('(. . . at)r(t . . .)') is ρα (ρο); in Indic, both give again the same result *r̥*. (1965:97)

Hoenigswald is referring to the peculiarity that the Sonantentheorie's **r̥* gives either αρ or ρα (or ορ/ρο) medially in Greek, e.g. ἔσπαρμαι perfect to σπείρω 'sow' (<**speryō*) : ἐτράπην second aorist to τρέπω 'turn'. For an attempt to define the phonological environments in which **r̥* and **l̥* will give αρ and αλ or ρα and λα in Greek, see O'Neil 1969.

In contrast to the schwa secundum theory, there is nothing *phonemically* objectionable about Hoenigswald's views, and so they represent an example of a system in which the assumption of $_{e}R/R_{e}$ rather than *R̥* might be viable. Rather, in this instance the value of assuming $_{e}R/R_{e}$ can only be judged on the basis of the explanatory power of Hoenigswald's theory as a whole, and unfortunately in that regard the theory suggests some improbabilities. It is debatable whether or not as a historical development the insertion of syllabicity on an iterative basis can be considered a natural process—at least, by counting consonants and inserting vocoids at regular intervals, rather than by taking into account the relative sonority of the consonants in each cluster (on which see Bell and Hooper 1978a:17). The best-studied languages that seem to assign syllabicity on an iterative basis at regular intervals (e.g. Old Irish and Tonkawa—see below, §§1.8 and 1.7, respectively) are best analyzed as subject historically to iterative schwa-deletion, rather than schwa-insertion. Allen (1956:141–2) makes a strong case for iterative anaptyxis in Abaza, but his analysis is independent of historical considerations, and at any rate depends upon the much-debated assumption that Abaza is a one-vowel language.[6]

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[6] For references see below, n. 7. It is of course well beyond the scope of this study to examine Abaza in detail, but it can at least be suggested

But regardless of whether or not iterative anaptyxis is a natural process, Hoenigswald's particular version of iterative anaptyxis is problematic. His dissociation of syllabicity assignment from the place of the accent raises important problems for the theory. There is no clear reason to expect, say, *pl_etw_es (Gk. πλατύς 'flat') rather than *p_elt_ews, or *$g^w{}_erH_ews$ (Gk. βαρύς 'heavy') rather than *$g^wr_eHw_es$. Without a readily definable point of reference from which to begin epenthesis, it is not possible to construct a formal epenthesis rule. Even without this difficulty of where to begin and end epenthesis, this hypothesis presents insuperable difficulties for formulation of the rule in generative notation: since *$_e$ is not a segment, it can only be specified as a feature, and if that is the case, how is $_eR$ to be distinguished from R_e?

Finally, there does not seem to be any good reason to believe that all PIE consonants, not just resonants, had syllabic allophones. And yet that is a necessary implication of Hoenigswald's theory (given that the reduced vowel is nonphonemic), as Polomé (1965:29 n. 126) seems to imply when

here that the situation might better be analyzed as syncope than anaptyxis, since by Allen's account the conditions for anaptyxis are 'highly complex, and a comprehensive statement has yet to be evolved' (1950:142). Such surface complexities are usually more readily explicable by syncope than by anaptyxis—an analysis that is intrinsically more plausible in the light of Bell's findings. Moreover, since Allen assumes, as he must, that the anaptyctic vowel is prosodic, not phonematic, his analysis faces the same obstacles to generative formulation as Hoenigswald's (discussed in the next paragraph). Naturally if Abaza shows the effects of syncope rather than anaptyxis on a synchronic basis, this cannot be considered a one-vowel language, and so the point is not to be conceded lightly, nor settled in a footnote. It should be stressed that epenthesis does occur on an iterative basis in many languages—for some examples see Allen 1973:36–7—but not simply by counting consonants. For an example of a right-to-left syncope rule (the sort that would be required for Abaza), see Ohala 1983:117–54, esp. 145–8. N. F. Nater's analysis of Bella Coola phonology (1979:174–8) is a good example of an analysis involving anaptyxis that almost certainly ought to be syncope instead: although Nater assumes the automatic vocalization of resonants in specific environments, it is also concluded that syllabic and nonsyllabic resonants are in fact phonemically distinct.

he remarks that in Gk. πίτνημι 'spread out', for instance, 'the vowel segment in the [$_e$t]-allophone of PIE /t/ has merely become part of the /i/-phoneme in the course of the diachronic development of Greek through merger with the allophones of this vowel in the environment /#C – C/.' But if any PIE consonant could be syllabic, then PIE *p_ek^wtos, for example, should be expected, when in fact only *pek^wtos/*pok^wtos occurs, as pointed out above. And so ultimately the notation $_eR/R_e$ cannot be justified on the basis of the explanatory power of Hoenigswald's theory.

1.6. PROPOSED COUNTEREVIDENCE TO THE SONANTENTHEORIE.

If the notation $_eR/R_e$ itself (disregarding how syllabicity is assigned) is not intrinsically objectionable on either phonetic or phonemic grounds, the notational question can only be settled on the basis of descriptive utility. Unless the notation $_eR/R_e$ can be shown to capture important generalizations that the notation *R̥* misses, then the latter must be preferred, being more general. It is pointless to debate the phonetic value of PIE syllabic consonants if the phonetic debate makes no phonological difference—and that is true regardless of whether one notation seems more clearly to reflect historical assumptions about the origin of syllabic consonants. In other words, even if it is widely acknowledged that a syllabic laryngeal reflects the coalescence of a consonantal laryngeal with a flanking vowel reduced under lack of stress, it is methodologically inadmissible to represent the syllabic laryngeal as *$_eH/H_e$ if this notation explains nothing that the more general notation **H̥* does not also explain. Thus Brosman (1957), though some of his reconstructions are questionable (see below), is on methodologically safe ground when he argues that Edgar Sturtevant's analysis of syllabic laryngeals into schwa secundum plus consonant ought to be discarded if it can be shown that the assumption of laryngeals with syllabic and nonsyllabic allophones on a par with the resonants' will account for the same phenomena. Note that this reasoning does not apply to the dispute over the representation of antevocalic syllabic consonants, since neither *-r̥r-* nor *-$_er$- is more general.

Since Brugmann's time a variety of evidence has been offered in support of the contention that the notation *R̥* is overly abstract, and cannot account for various phenomena that can be explained by the more concrete notation $_{e}R/R_{e}$. The following survey of the evidence is selective, but I think represents the best arguments advanced so far.

Hoenigswald (1953) presents some cases in which his analysis seems superior to the standard view of PIE syllabic consonants. Gk. δασύς 'thick' appears to be cognate with Lat. _dēnsus_ 'thick', in which case _*dn̥sus_ should be reconstructed for both words. The difficulty with this view is that intervocalic sigma is lost in Greek, and from 3. sg. δέδαε 'taught' (<_*dedn̥se[t]_) it may be concluded that _*n̥_ functions as a vowel in the application of this rule. Hoenigswald's hypothesis provides a ready solution, since δασύς may be derived from *$d_{e}nsus$ (where _s_ is not intervocalic), and δέδαε from *$dedn_{e}se(t)$. But it should be pointed out that while this is a possible solution to the Greek problem, it does not seem possible to relate the Greek developments to PIE conditions. For instance, related to δασύς is δαυλός 'shaggy' (Aeschylus), from _*dn̥sulos_, in which the allophone of /n/ must have been *n_{e}, since sigma is lost here. Then given the comparison with δασύς, it does not seem possible to predict which syllabic allophone, *$_{e}n$ or *n_{e}, will appear in any given form; and if the precise allophone is unpredictable, then the two can only have been in free variation, meaning that the loss or preservation of sigma in these words is essentially a random choice. More important, if *$_{e}n$ and *n_{e} were in free variation, then this notation is useless, since the choice of one in any given form wrongly excludes the occurrence of the other. A related difficulty is that antevocalic sigma is usually preserved after -ρα- < _*-r̥-_, e.g. in πράσον 'leek, seaweed' (=Lat. _porrum_) and θρασύς 'bold', to which cf. Argive Θράυλος (accent!). For other examples see Schwyzer (1939–50:1.307). This preservation of sigma cannot be reconciled with Hoenigswald's view (see above, §1.5) that Gk. αρ (ορ) reflects *$_{e}r$, while *r_{e} is reflected as ρα (ρο).

Equally problematic is Hoenigswald's argument concerning Homeric ῥά, an enclitic form of ἄρα, ἄρ 'then, straightway'. Hoenigswald points out that ῥά is restricted almost entirely to use after light syllables in the _Iliad_. This distribution of ῥά makes sense if the word is to be derived from simple syllabic _r̥_, since after heavy syllables *$_{e}r$ might be expected, giving enclitic **ἄρ. It seems unlikely, however, that ῥά could reflect simple PIE *_r̥_ rather than *_Hr̥_. The former would have an unusual structure for a PIE morpheme, and would render the form ἄρα etymologically difficult. Cf. full grade of the morpheme in the Baltic interrogative particles Lith. _ar̃_, Latv. _ar_.

Hoenigswald also offers his hypothesis of PIE nonphonemic reduced vowels as an explanation for certain much-discussed cases of loss of schwa in Indo-Iranian (1965:98; cf. Kuryłowicz' earlier explanation, discussed below). With prefixes the Skt. roots _dā_ 'give' and _dā_ 'divide' give the past passive participle _-tta-_ (presumably from *_-dH-_ + _-to-_), e.g. in _ánutta-_, _prátta-_, etc. It seems one should expect *_-dita-_ < *_-dH̥-to-_, but instead the laryngeal has been lost without a trace. Beside these syncopated forms are uncompounded Vedic _dātá-_ 'given', and _ditá-_ 'divided', which do not show syncope. Hoenigswald's explanation is that in Sanskrit only *$_eH$ corresponds to Brugmann's *_ə_, while *_H_ behaves before the reduced vowel as it does before any other vowel: it is simply lost. Then the reduced vowel, being automatic and being no longer conditioned after the loss of the preceding *_H_, is also lost. So _-tta-_ reflects *_-dH_$_e$_to-_, while uncompounded _ditá-_ derives from *_d_$_e$_Hto-_, and the distinction in the position of the reduced vowel is due to 'special conditions of compounding'. Two objections suggest themselves. First, to claim the loss of the reduced vowel after the loss of the laryngeal, on the grounds that its appearance is automatic, is essentially to rely on the converse of Sievers' law, which, it was pointed out above (§1.2), is not a tenable hypothesis. Second, the reliance on vague 'special conditions of compounding' to account for the alternation between *$_eH$ and *H_e is not convincing, and conflicts with Hoenigswald's hypothesis about the automatic appearance of *$_e$ after every two consonants. If the appearance or nonappearance of *$_e$ is to be attributed to PIE conditions at all, in order for the theory to convince, a precise rule must be formulated.

Hoenigswald's analysis of *_ə_ as *$_eH$ (and never *H_e) is directly contrary to Kuryłowicz' earlier contention (1927b: 233) that *_ə_ represents *H_e, never *$_eH$. Kuryłowicz (1935: 55–6) uses this analysis to explain the loss of *_ə_ in the Skt. reduplicated 1. pl. presents _dadmáḥ_ 'give' and _dadhmáḥ_ 'put' (for expected *_dadimáḥ_ and *_dadhimáḥ_), as opposed to the perfects _dadimá_ and _dadhimá_. For the perfect forms he reconstructs *_-dH$_e$-_ and *_-dhH$_e$-_, giving _-di-_ and _-dhi-_, and for the present forms *_-d$_e$H-_ and *_-dh$_e$H-_, with loss of the reduced vowel leading to simplification of the consonant cluster through loss of the laryngeal. Brosman (1957: 14–6) argues that _dadhmáḥ_ is explicable under Edgerton's rules, given the assumption that *_H_ behaved in the same manner as the sonorants. He reconstructs *_dhidhHm̥mes_, with the antevocalic syllabic *_m̥_ Edgerton's rules demand. Then as usual, *_H_ is lost before a syllabic segment, and *_m̥_, now following a light syllable, becomes nonsyllabic by the converse of Sievers' law, giving *_dhidhmes_. Brosman's analysis is objectionable on a variety of grounds. The reliance on the converse of Sievers' law is unacceptable, and the reconstruction *_-m̥mes_ is unlikely, since there is no evidence for such allophonic patterning in conjugational endings in Indic, or any other IE language: cf. the remarks above (§1.2) about _cakr̥má_ and _cakr̥vā́ṁs-_ (rather than **_cakramá_ and **_cakruvā́ṁs-_). Objections to Kuryłowicz' analysis also suggest themselves. The explanation why the reduced vowel is lost in the present forms (simply that it is lost dialectally after consonant plus laryngeal) does not seem well motivated. Nor is it clear why *$_e$_H_ appears in the present and *_H$_e$_ in the perfect. After all, the morphemic structure and accentuation of these present and perfect forms is the same. The claim that perf. *_-k^{w}r$_e$-_ and *_-dH$_e$-_ are simply the reduction of the perfect full-grade vocalism in *_-k^{w}re-_ and *_-dHe-_ demonstrated by 2.-3. du. act. _cakrát(h)uḥ, dadát(h)uḥ_ relies on the unusual assumption that the desinence in these forms is _-t(h)uḥ_ rather than _-át(h)uḥ_, an assumption that converts the perfect inflectional pattern from a very regular system (i.e. consistent weak grade of the stem everywhere except in the active singular, just as in the other tense systems) to a very irregular one, with alternating thematic and athematic forms. Moreover, this analysis of _cakrát(h)uḥ_ and _dadát(h)uḥ_ also demands the assumption of two discrete PIE periods of vowel reduction—one to produce the perfect alternation *_-k^{w}or-_/*_-k^{w}re-_, and another to reduce *_-k^{w}re-_ to *_-k^{w}r$_e$-_.

Kuryłowicz (1935:57–8) suggests that *$_e$_H_ in initial syllables will give a long vowel, while in medial syllables

$^*{}_eH$ will disappear. So for instance Skt. *dātá-* 'given' and the compounded form *-tta-* both reflect $^*d_eHto$-, while Gk. δοτός reflects $^*dH_etos$. Initial versus medial syllable position, it should be remarked, seems an unlikely conditioning factor for a Proto-Indo-European sound change. Starting from Kuryłowicz' assumptions, Polomé (1965:29 n. 126) points out that Hoenigswald's hypothesis about the appearance of the reduced vowel after every two consonants could explain the long vowels in some PIE past passive participles as reflected in Greek, where reduced grade is expected, instead. His examples are πλητός ($<^*pl_eHt\acute{o}s$), which seems to be unattested (presumably to πίμπλημι 'fill'), and γνωτός 'known' ($<^*\hat{g}n_eHt\acute{o}s$), beside θετός 'placed' ($<^*dhH_et\acute{o}s$), and δοτός 'given' ($<^*dH_et\acute{o}s$). There does seem to be a general correspondence of this sort in such participles in Greek, but the number of word-initial consonants does not seem to affect the place of $^*{}_e$ outside of this category in Greek (see the examples in the next paragraph); and so the older explanation is perhaps preferable, that πλητός, γνωτός, etc., reflect forms with long syllabic resonants, or their equivalent in laryngeal theory. Cf. also R. A. Crossland's (1952; 1958:96–7) derivation of Gk. δμητός and Skt. *dāṁtáḥ* 'tame' from $^*dm_eHt\acute{o}s$ and $^*d_emHt\acute{o}s$, respectively; and of Lat. *grātus* and Skt. *gūrtáḥ* 'welcome' from $^*g^wr_eHt\acute{o}s$ and $^*g^w{}_erHt\acute{o}s$, respectively.

Similarly it has been claimed that the problem of the alternate realizations of the PIE long syllabic resonants in Greek, Latin, and Celtic can be explained with the help of the reduced vowel. For instance in Greek, PIE **n̥̄* (or **n̥H*) may appear as either -ανα- or -νᾱ-; and so (to cite the most discussed example) θάνατος 'death' is found beside θνητός adj. 'mortal'. Other examples are δάμασις 'taming' beside ἄδμητος 'wild'; κάρᾱνον 'head' (<*κάρασνον, cf. Skt. *śirṣán-* 'head') beside κρᾱτός gen. singular of κράς 'head'; and κάματος 'labor' beside κμητός 'wrought' (only in compounds). Kuryłowicz (1935:68–9) suggests that the difference is due to the position of the reduced vowel, as determined by the place of the accent, and so θάνατος derives from $^*dh(w)_enH_etos$, and θνητός from $^*dh(w)n_eHtos$. This view gained a good deal of currency, though Kuryłowicz himself later abandoned it (1956:199–200) in favor of the assumption that the vocalism of θάνατος and the like is a post-PIE innovation whereby full grade (i.e. in *θένατος or *θόνατος) was replaced analogically by reduced grade—a solution first suggested by van Wijk (1906/1907:342–3), who was himself unable to decide whether the change of *-εν- (or *-ον-) to -αν- represents analogical intrusion of reduced grade, or vowel assimilation. The two positions are defended by Specht (1932:115) and Cowgill (1965:150), respectively. The latter remarks, 'I see no reason whatever a priori to assume that θάνατος continues the same ablaut grade as θνᾱτός', since 'it does not seem impossible that a *θένατος (or *θόνατος) could have become θάνατος by assimilation.' That θάνατος and θνητός do not reflect the same ablaut grade is rendered likely by Specht's observation, 'Während Partizipien wie θνητός alte Endbetonung eigen ist, haben die Verbalabstrakta Wurzelbetonung mit *o*-Abtönung.' Among his examples are πλοῦτος 'wealth', οἶτος 'fate', φόρτος 'freight', νόστος 'return homeward', Skt. *srótaḥ* 'current', and Gothic *aiþs* 'oath'. But in this instance the Skt. cognates *dhvāntáḥ* 'dark' (both noun and adjective; and according to Brugmann 1897–1916:1.1.420, with *n* analogically inserted in **dhvātáḥ*=θνητός, θάνατος) argue otherwise, and there are counterexamples to Specht's evidence for *o*-grade and accentuation of the root in this type of formation, e.g. Skt. *cittá-* 'observation' (from the root *cit* 'perceive', cf. Av. *čistā-* 'wisdom') and Gk. βλαστός 'bud' (see Schwyzer 1939–50:1.501). Moreover, even if the different vocalism of θάνατος and θνητός represents a distinction of PIE ablaut grade, that cannot be the case as regards the different vocalism of θνητός and its antonym ἀθάνατος, formed simply by the prefixation of privative **n̥*-. (The accent shift accompanying prefixation of **n̥*- is Proto-Indo-European, but apparently late: it never entails a change of quantitative ablaut grade. Cf., e.g., Vedic *ákr̥ta-* beside *kr̥tá-* 'done', and *áhita-* beside *hitá-*, root *dhā* 'place', etc.) Admittedly, however, ἀθάνατος need not be any older than Hellenic itself, and that seems to be Collinge's position (1957:57).

If θάνατος does represent an original *θόνατος, Specht's analysis may be preferred to Cowgill's, since reliance on vowel assimilation in Greek leaves unexplained the Italic and Celtic dissyllabic realizations of PIE long syllabic resonants, e.g. in OIr. *talam*, gen. *talman* 'earth', and Lat. *janitrīcēs* 'wives of brothers' (cf. Skt. *yā́tar-* 'idem').

In sum, there are too many uncertainties to justify a firm commitment to any of the proposed explanations of these dissyllabic reflexes of the ‘long syllabic resonants’. The reduced-vowel explanation will seem conjectural as long as no tenable reason can be given for the alternation between -$_{e}RH_{e}$- and -$R_{e}H$- in the same stem. Under any circumstances an untenable aspect of Kuryłowicz’ first explanation is the claim, derived from Hirt (1921–37:2.132), that the different positions of the reduced vowel in θάνατος and θνητός are due to different PIE accentuation. If θάνατος shows original reduced vocalism in the root, the position of the accent is necessarily secondary, given that reduced vowels arose historically only in unaccented syllables.

Finally, Hirt (1921–37:2.89–91) argues that the Sonantentheorie is inadequate to explain the reflexes of PIE *_r̥_, *_l̥_, *_m̥_, and *_n̥_ before resonants, since these reflexes are often different from the normal reflexes of the syllabic resonants. So for instance *-_n̥y_- gives Gk. -αιν- (rather than *-αι-), with metathesis, in τέκταινα ‘(female) carpenter’ (<*-_n̥yā_, cf. τέκτων ‘[male] carpenter’), and *-_r̥w_- gives Skt. -_urv_- rather than *-_r̥v_- in 1. du. _kurváḥ_ ‘make’. Brugmann (1897–1916:1.1.458) attributes exceptions such as the perf. act. part. _cakr̥vā́ṁs_- to analogy, and it was argued above (§1.2) that this is in fact the case. Hirt’s explanation is that the reduced vowel and the resonant fell in separate syllables, and so could not give the normal monophonematic reflexes—e.g., PIE $^*g^{w}{}_{e}my\bar{o}$ was syllabicated as $^*g^{w}{}_{e}.my\bar{o}$. It is in fact correct that similar clusters of the type occlusive + resonant are tautosyllabic in Greek (Schwyzer 1939–50: 1.324–7). But Hirt’s analysis is unlikely because the allophone in such forms is always $_{e}R$ (or _R̥R_ in Edgerton’s notation), never R_{e}. (Hirt of course does not consider $_{e}R$ a monophonematic segment, but it was argued above, §1.5, that $^*{}_{e}$ cannot be a phoneme; and at any rate $_{e}R$ must be an allophone here, since it is in complementary distribution with _R̥_, which does not appear in this environment.) The best way to account for this distribution is simply to assume that the phonotactic rule governing the form of syllabic resonants before vowels in fact applied before all sonorant segments, vocalic and otherwise. In that event, such forms prove nothing about the normal, non-antevocalic syllabic allophones of these consonants.

In sum, then, none of the evidence proposed to demonstrate the necessity of the notation ${}_eR/R_e$ is very compelling. The only likely evidence seems to be the alternate realizations of long syllabic resonants in Greek, Latin, and Celtic, but even here there is considerable uncertainty; and at any rate, before any reduced-vowel analysis of the long syllabic resonants can be deemed possible, it must first be demonstrated under what conditions $-{}_eRH_e-$ will appear instead of $-R_eH-$. Otherwise, once again, ${}_eR$ and R_e can only have been in free variation, in which case (as with δασύς above) neither is an acceptable reconstruction in any given form, since it wrongly excludes the occurrence of the other. Accordingly, since the notation ${}_eR/R_e$ does not explain anything that R̥ does not also explain, it may now be assumed that regardless of etymology and actual phonetic value, interconsonantal PIE syllabic consonants ought only to be represented as R̥.

1.7. BORGSTRØM'S MODEL OF PROTO-INDO-EUROPEAN SYNCOPE.

Aside from Hoenigswald's hypothesis there has been just one other attempt to construct iterative rules that will account for the quantitative ablaut alternations of all syllables in any given word in Proto-Indo-European. Carl Hjalmar Borgstrøm (1949) offered a comprehensive theory of early PIE syncope, and then devoted a series of articles (1952; 1954a; 1954b) to elaborating his views. According to Borgstrøm, there were two periods of syncope in Proto-Indo-European. The first is encompassed in a 'mechanical rule', which may be formulated, 'In words containing more than two consonants, the final vowel was preserved and then every second vowel from the end was syncopated' (1949:141). The second syncope consists of two rules that may be stated, '1. *Final unaccented vowels were dropped unless an ending was added to the word soon after the end of the mechanical rule.* ... 2. *Unaccented vowels in non-final syllables were dropped*' (1952:138). Beginning then from the assumption that there were no consonant clusters at the earliest stage of Proto-Indo-European, and representing the one vowel he posits for this stage as *ä*, he reconstructs 3. sg. **Häsä-tä* and 3. pl. **Häsä-nätä* in the paradigm of the verb 'be'. After the application of the mechanical rule these forms yield **Häs-tä* and **Hsä-ntä*, respectively; these develop to **Häst* and **Hsänt* after the second syncope; and with the loss of laryngeals and the development of qualitative ablaut, the results are **est* and **sent*. From these are formed **esti* and **senti*/**sonti* (from which the attested IE forms are derived, Skt. *ásti*, *sánti*, Gk. ἐστί, εἰσί, etc.), by the addition of *-i* when the distinction arose between primary and secondary endings (see below, §4.1). As an example of an athematic noun conforming to these rules, Borgstrøm offers PIE **dyēws* 'day, heaven, god of heaven' (Skt. *dyāúḥ*, Gk. Ζεύς, etc.), which he derives from **däyäwä-sä*. This explanation relies on Streitberg's (1894) theory of the origin of lengthened grade to explain the vocalism of **dyēws*: loss of a following syllable induces the lengthening of the vowel. On the other hand, thematic nouns seem to contradict the hypothesis, since this same **däyäwä-sä* cannot be reconstructed for PIE **deywos* 'god' (Skt. *deváḥ*, Lat. *deus*, etc.). Borgstrøm's explanation is that thematic nouns were originally inflectionless in the nominative and accusative singular. After the application of the mechanical rule (**däyäwä* > **däywä*), the nominative and accusative endings **-sä* and **-mä* were added, and the forms then developed regularly under the rules of the second syncope.

Borgstrøm offers evidence for the naturalness of his hypothesis by examining similar alternations in Tonkawa, a native American language. After considering these alternations he concludes, 'The regular morphophonemic pattern of Tonkawa may be summed up in the following two rules: 1) *Assuming the structure CVCVCV, . . . vowels are dropped in even numbered positions in the word*; 2) *the final vowel in a word (noun) is dropped and the vowel of the penultima is retained*' (1954a:126). These patterns bear obvious affinities to those Borgstrøm perceives in Proto-Indo-European, particularly in regard to consistently open syllable structure and iterative syncope in alternate syllables.

Szemerényi (1980:105–6) objects to this hypothesis on several grounds. First, on the basis of Borgstrøm's mechanical rule, in the same paradigm as **est(i)* and **sent(i)*/**sont(i)* one would expect 1. pl. **esmes* or **sems*, when in fact what appears is **smes*, reflected in Vedic *smáḥ*. This objection will be shown below to be specious (§3.2.2), since the evidence of most IE branches does in fact point to **esmes*, and the Indic form can readily be explained as analogical. A more telling objection is that the theory predicts that no clusters of three or more consonants will be found in Proto-Indo-European, and yet such do occur in apparently archaic forms, such as Skt. _dvéṣṭi_ 'hates' (<*_dweysti_). Borgstrøm himself points out these exceptions, and attributes them to subsequent developments. Szemerényi also objects to the claim that the most archaic state of Proto-Indo-European had just one vowel (_ä_). There has been considerable controversy about this claim, fueled by attempts to identify parallels in natural languages. The controversy has centered on some Northwest Caucasian languages, particularly Kabardian and Abaza.[7] It will be shown below (§1.8) that there is nothing improbable about an _unstressed_ vowel system derived synchronically from a single underlying and essentially featureless vowel, since that is the system encountered in Old Irish. Nor is it inconceivable that the PIE stressed vowel system could have been impoverished accordingly under the influence of paradigm regularization and pure Systemzwang. On the other hand, one ought to be skeptical about assuming such an impoverished vowel system at a stage anterior to the application of the stress accent, as Borgstrøm assumes. Such a minimal vowel system ought rather to be the product of the vowel-reducing effects of the stress accent, since reduction in the variety of unstressed vowels is the pattern repeated continually in the historical phonology of languages with stress accent.

Additional improbabilities may be mentioned. In order to account for the lack of any inflection in the nom.-acc. singular of the original state of athematic nouns, Borgstrøm assumes that the original distinction between thematic and athematic forms was an animate/inanimate one. This assumption leads to some unlikely claims, such as the following: 'The names of animals are divided; the words for "dog" and "wild beast" are animate, while *_peḱu_ "sheep" was inanimate; so even *_h_$_1$_eḱwo-s_ "horse" if this is not a later word. *_Präk_^{w}_-sä_ "prayer" and *_wäk_^{w}_-sä_ "voice" were animate because they designated magic agents' (1949:146). Moreover, Borgstrøm explicitly divorces the operation of the mechanical rule (but not the second syncope) from the influence of the accent. The phonetic motivation for regular and iterative syncope without reference to the stress accent (perhaps even in spite of the stress accent) is difficult to fathom.[8] A further improbability is that even after the process of syncope has been divided into three separate rules, the theory does not deal with the problem of syllabicity in unaccented syllables—vowels are either syncopated or retained, and the existence of forms like PIE **pekʷtos* beside **dr̥tos* cannot be accounted for. The problem here is the same one mentioned in the context of Hirt's and Sturtevant's theories of schwa secundum (§1.5): if it is true, as Indo-Europeanists now seem agreed, that no phonemic distinction is possible between reduced and zero grades at the latest reconstructible stage of Proto-Indo-European, still in all likelihood the syllabicity of *-TR̥T-* results historically not from the spontaneous voicing of the resonant but from a lost flanking vowel, since Alan Bell's study of syllabic consonants indicates that the latter origin for the syllabicity is typologically more natural. It may be true as a synchronic statement about late Proto-Indo-European that resonants are automatically vocalized between obstruents, but still, Bell's study indicates, the nonexistence of *-TRT-*, with nonsyllabic *R*, is probably not due *historically* to any automatic vocalization of *R* in this environment. It is instead very likely due to the loss of nonsyllabic *R* between consonants, e.g. in Vedic *áśnā* < PIE **HeḱmneH*, and *budhnáḥ* < **bhudhmnos*. In short, any analysis that, like Borgstrøm's, recognizes *historically* no intermediate state between full and zero grades is incapable of accounting for variations in unstressed vocalism. Under Borgstrøm's hypothesis **pekʷtos* and **dr̥tos* reflect originally different ablaut grades, rather than a single reduced grade, and so apparently it is simply coincidence that in these participial stems, and in many other places in IE declension, roots that contain resonants are in weak grade and those that do not contain resonants are in full grade. That this could actually be simply a coincidence is of course improbable.

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[7] See Allen (1956; 1965), Martinet (1957:42–3), Kuipers (1960; 1968; 1976), Gamkrelidze (1966), Szemerényi (1967), Halle (1970), Anderson (1978), and Crothers (1978:108).

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[8] This is not to disparage the evidence Szemerényi (1964) adduces for Greek and PIE syncope concurrent with the application of pitch accent, which conforms to what Bell (1978:165) terms 'high-vowel syncope'. But Szemerényi carefully distinguishes between this infrequent syncope and the earlier PIE syncope that gave rise to quantitative ablaut, and is of such far-reaching proportions that it cannot be dissociated from the assumption of early PIE stress accent (1964:290).

One final criticism of Borgstrøm's model is that his two rules governing the second syncope are not credible. Particularly implausible is the first rule, '*Final unaccented vowels were dropped unless an ending was added to the word soon after the end of the mechanical rule.*' The qualifying clause in this rule is intended to account for the preservation of the theme vowel in forms like **deywos* and **deywom*, given that they reflect **däywä-* plus the endings **-sä* and **-mä* added after the application of the mechanical rule, but before the second syncope. It is not easy to imagine how in a diachronic process the purely phonological second syncope rule could distinguish unstressed vowels that used to be (but no longer are) word-final, from all other unstressed vowels.[9]

The theory underwent several important changes. Borgstrøm eventually abandoned his assumption that Proto-Indo-European had consistently optimal syllable structure (*CVCVCVCV . . .*) before syncope (1954a:128; 1954b:276–81). The difficulty prompting this change of view was that he had now taken into account the arguments of Ammer (1952; see also Lehmann 1952:106–7) to the effect that PIE triconsonantal roots show a monosyllabic structure: the consonants at the margins of the root are never more sonorous than those in the middle of the root. So for instance */bh–r–t/ is a possible consonantal structure for a PIE root, while **/H–t–r/ is not, since it is necessarily dissyllabic, both *H* and *r* having greater aperture than *t*. Such constraints on root structure are not comprehensible if PIE had consistently open syllable structure: avoidance of root consonantism such as **/H–t–r/ is understandable as a consequence of a PIE requirement that roots be monosyllabic only given the assumption that that requirement originated after a supposed PIE **Hätär* had become **Hätr* and/or **Htär*. And so an acceptable root such as */bh–r–t/ could have had just one vocoid, i.e. **bhärt* or **bhrät* or **bhr̥t*, but not **bhärät*, at the time when PIE root structure was established.

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[9] It is true that some generative phonologists construct synchronic rules subject to global constraints, but even in these instances, reference to derivational history seems to be limited to reference to underlying forms rather than to the application of other rules (see Sommerstein 1977:190–2), and so the rule under consideration here does not belong to this category.

A natural consequence of Borgstrøm's abandoning his assumption of consistent PIE open syllable structure was his eventual decision to dissociate syncope from his mechanical rule altogether. The vowel alternations described by the rule then are due 'not to syncope of original vowels, but to redistribution of vowels conditioned by the number of consonants in every word-form' (1954a:128), and his final formulation of the rule (1954b:282) makes no mention of vowel loss at all. The result then is a system of vowel alternations conditioned very much the way Hoenigswald's epenthetic vowels are conditioned (§1.5), and so it is subject to the same criticisms. There does not appear to be any natural language that distributes vowels by means of counting intervening consonants, and Borgstrøm himself points out that the distribution of vowels in Tonkawa is not regulated that way (1954a:128). And so the revised version of the mechanical rule seems even less tenable than the original version. But in fact the evidence for monosyllabic root structure ought not alone to dictate such a change in the mechanical rule. As Borgstrøm points out (1954b:279), the monosyllabic structure of triconsonantal roots must have been established at a time when roots alone constituted complete words, and had not yet acquired suffixes, determinatives ('enlargements'), infixes, or inflectional endings. This puts the process at an extrememly archaic state of the protolanguage, and so actually there is no very good reason to assume a priori that the vocalism of such an ancient state of the language was the same as, or even very similar to, that at the time Borgstrøm's mechanical rule would have applied—which was certainly at a later date, since at least some words had acquired inflections by then. For instance, it could be that the alternants **bhärt* and **bhrät* that presumably were created under the requirements of monosyllabic root structure later yielded **bhärät* once again, by analogical leveling of alternants. But of course this is mere conjecture, since, aside from the evidence of root structure, nothing certain is known about PIE vocalism before the period of syncope. And so it is not sound method to allow the evidence of root structure to wield undue influence over assumptions about PIE vocalism during the period of syncope.

Borgstrøm's model provides valuable insights into PIE vocalic alternations, but clearly it faces some serious difficulties—some of the same difficulties Hoenigswald's hypothesis faces. These two theories seem to be the only ones yet proposed that attempt to account for the vocalism of entire PIE words on the basis of iterative rules that assign patterns of syllabicity to strings of consonants. Neither theory succeeds because neither assumes as an unalterable given that the syllabic pattern is the result of syncope. Yet syncope ought to be the basis for any such theory, not only because it is certain that the protolanguage did suffer some sort of syncopic process, but also because the phenomena to be explained, the alternations of syllabic consonants, are generally the result of syncope in natural languages, as argued by Bell—probably always the result of syncope when such alternations reflect iterative syllabicity assignment at regular intervals in a string. Perhaps the best way to gather a general idea of what iterative syncope in Proto-Indo-European might have been like is to examine the effects of iterative syncope in a natural language. Unquestionably the relevant language that has been studied most thoroughly is Old Irish, and this will serve as a reasonable basis for comparison.

1.8. SYNCOPE IN OLD IRISH. In Old Irish the pattern of vocalism in the entire word is determined by the place of the primary stress accent. Alternations in the position of the primary accent may result in such far-reaching vowel alternations that forms within a single paradigm may seem entirely unrelated. This is best illustrated in verbs with prefixes, since the rule is that in most conjugational forms the accent will fall on the second prefix. For instance, in *con·osna* [kɔnɔsNə] 'rests', *con* is a prefix, and the second *o* is accented. When another prefix is added, the accent will shift to *con*, and *con·osna* will become *·cumsana* [kʊmsənə], in which the accented vowel of *con·osna* has completely disappeared, and *a* has appeared between *s* and *n*, where previously there was no vowel. The historical explanation is that both forms are derived from **kom-uss-ana* < **kom-uds-anə-t* or **kom-ups-anə-t*. After the assignment of the primary accent, an iterative rule applies a secondary accent to every second syllable from left to right, starting after the primary accented syllable; and the last syllable always receives a secondary accent, as well. Quite a number of natural languages have similar iterative stress rules: for examples see Hastings 1974; and Allen 1973:90; and for an example of an identical interaction between a primary stress rule and an iterative secondary stress rule, in Finnish, see Lehiste 1970:163–4. Historically, in Old Irish, after the application of the stress rules, all vowels without either type of accent were lost, while those with secondary accent were reduced to [ə]—presumably after the secondary accent itself was lost. Loss of the secondary accent would result naturally from the deletion of unstressed vowels, since this would mean that all remaining vowels without primary stress bore secondary stress, thus rendering secondary stress nondistinctive. So with primary accent on the first syllable, _*-kúm-uss-ànà_ (with _*-kúm-_ < _-*kóm-_ before _u_ in the following syllable) gives _·cumsana_; and with accent on the second syllable, _*kòm-úss-anà_ gives _con·osna_. Secondary stress (and therefore syncope) in pretonic syllables is not governed by the position of the primary accent, and so there is no syncope in the first syllable of _con·osna_.

Historically, consonants absorbed certain qualities of following vowels that were reduced or deleted: consonants before original _u_ were labialized, and consonants before _e_ and _i_ were palatalized. Preserved vowels without primary stress—i.e., those preserved as [ə]—then acquired qualities determined solely by the secondary articulations of flanking consonants. For example, an unstressed vowel between two palatalized consonants will appear in the orthography as _i_; between labialized consonants it will appear as _u_; between a palatalized consonant and a neutral one it will appear as _e_, etc. Consonant qualities were then assimilated, usually from left to right, in consonant groups arising from syncope.[10] The following forms illustrate the effects of syncope and unstressed vowel coloration, and at the same time demonstrate that secondary stress assignment was iterative, applying to the second and fourth syllables after the syllable bearing primary stress:

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[10] There is, on the other hand, a strong tendency for original _o_ with secondary stress to retain rounding, and this explains why _con_ appears rather than _*can_ in _con·osna_.

·tomnibther [tɔmnɪfʸθʸer] 3. sg. fut. pass. ‘think’ derives from *[tɔmnʸɪfʸθʸer] < *[tɔmnʸəfʸθʸər] < *[tɔ́mənʸə̀fʸəθʸə̀r] < **to-moni-Fiter.*[11]

suidigthe [sʊðʸɪγʸθʸe] pret. pass. part. ‘place’ derives from *[sɔðʸəγʸθʸə] < *[sɔ́ðʸəhə̀γʸəθʸə̀] < **sodesagitjo-.*

indn(a)ide [ɪNdNɪðʸe] verbal noun ‘await’ derives from *[ɪNdNʸɪðʸe] < *[ɪNdNʸəðʸə] < *[ɪ́Ndənʸə̀həðʸə̀] < **indo-nē-sodjon.*

·dergēnsat [dʸer·γe:Nsət] 3. pl. perf. ‘do’ from *[dʸerγʸe:Nsət] < *[dʸerγʸəγNsət] < *[dʸérəγʸə̀γnəsə̀t] < *[dʸérəγʸə̀γnʸəsə̀t] < **de-ro-gegnī-ss-n̥t.*

For further examples of iterative syncope in Old Irish see Thurneysen (1946:67–9), Lewis and Pedersen (1974:70), and Pokorny (1914:18–20).

That, at any rate, is the historical explanation. Synchronically, however, does Old Irish retain the accent and vowel reduction rules, or does it instead epenthesize schwas on a regular basis between groups of consonants—in other words, is this a case of what Vennemann (1972) calls ‘rule inversion’? The question arises because such rule inversion would transform Old Irish unstressed vocalic alternations into a system governed almost precisely the way Borgstrøm's final version of his mechanical rule (§1.7) and Hoenigswald's claims about epenthesis (§1.5) suggest that PIE vocalism was regulated. The answer is that a synchronic grammar of Old Irish could not account for these vowel alternations on the basis of epenthesis. It is true, in Old Irish [ə] is epenthesized between consonants where historically there never was a phonemic vowel, e.g. *ingainnte* ‘unusualness’ [ɪŋgəNʸtʸe] (or [ɪŋgɪNʸtʸe], pre-Irish **ingnathe*, cf. *ingnad* ‘unusual’), and *comallnad* verbal noun ‘fulfill’ [kɔβəLNəð] (pre-Irish **comlānad*, cf. *comlán* ‘complete’). But this epenthesis is limited to the position before sonorants in certain environments—what has actually happened is that the sonorant became syllabic when the following vowel was lost, and later, syllabic consonants were eliminated, reanalyzed as biphonemic sequences of vowel plus nonsyllabic resonant. And so this epenthesis will not account for the vocalism of a form such as *suidigthe*, above. And clearly there would have to be morphological information involved in the assignment of unstressed vocalism in Old Irish if all unstressed vowels were epenthesized, since a consonant sequence which in one morpheme appears to take such epenthesis will never be broken up in another. For example, the verbal root *-ned-* alternates with *-nd-* (e.g. *fuined* verbal noun 'setting [of the sun]' < **fo-ned-* : *tairinnid* 2. pl. impv. 'lower, take down' < **to-air-fo-ned-e-te*, with *-nn-* < **-nd-*), while the verb prefix *ind-* will never develop a vowel between the *n* and the *d*, no matter what other elements precede or follow it in the word. Therefore epenthesis of all unstressed vowels in Old Irish could not be regulated on a purely phonological basis, as with Borgstrøm's and Hoenigswald's hypotheses. Rather, unless relexicalization occurred at this early date (resulting, e.g., in separate lexical entries for the stems of *con·osna* and *·cumsana*), in a synchronic grammar of Old Irish, unstressed vowels must be deleted rather than epenthesized. And so in either event, with or without relexicalization, Old Irish unstressed vowels are phonemic, unlike Hoenigswald's reduced vowel, and must be specified in the lexicon.

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[11] The symbol *F* in this form represents a pure abstraction, since the etymon of the Old Irish future-marking morpheme *-f-* is disputed: see Thurneysen 1946:398; Watkins 1966; Quin 1978; and Bammesberger 1979.

Moreover, unless relexicalization did occur, it seems unlikely that the historical rules of stress assignment and vowel reduction can be simplified in any way in a synchronic grammar of Old Irish. Lightner (1972:378–9) remarks that his own conventions for the formulation of generative rules are incapable of describing Old Irish iterative syncope in generative notation. He points out that a rule formulated with his notation would result in syncope of all vowels after the first one, and he seems to believe that the notational conventions proposed by Chomsky and Halle (1968) would fare better. I think, though, that if the rule were formulated properly in Chomsky and Halle's notation, using the so-called 'parenthesis-star' formalism (Chomsky and Halle 1968:344), it would produce the same results. The difficulty is that the rule always alters its own conditioning environment. The reason for Lightner's notational difficulties is that he is attempting to write a rule that will syncopate every second vowel, rather than one that syncopates every unstressed vowel. Rather, in a synchronic grammar the iterative secondary stress assignment rule still must precede the syncope rule—and the iterative secondary stress assignment rule can be formulated in conventional generative notation, since it does not alter its own conditioning environment. It seems, then, that barring relexicalization, the historical stress assignment rules must be reflected intact in a synchronic grammar of Old Irish.

1.9. A THEORY OF SYNCOPE IN PRE-INDO-EUROPEAN. Despite the shortcomings of Borgstrøm's and Hoenigswald's hypotheses, the assumption of recurrent syllabicity at equal intervals in strings of consonants is not intrinsically. implausible. Certainly one of the appealing aspects of Hoenigswald's theory is that it demonstrates an underlying orderliness to the Edgertonian patterns of syllabicity in Proto-Indo-European. Edgerton himself could only express those patterns in a long, ungainly list, as formulated in Table 1.3. Hoenigswald demonstrates that this list can be reduced to a simple underlying principle, one of biconsonantal clusters. Admittedly, the claim that there was regularly a vocoid after every two consonants in the protolanguage is somewhat stronger than can be considered probable: there will always be exceptions like Skt. *dvéṣṭi* (§1.7). But it should be remarked that the problem of the existence of PIE triconsonantal clusters is not one that renders Edgerton's analysis superior, since, for instance, his analysis is equally incapable of accounting for nonsyllabic *y* after heavy syllables in the *devī*-type of *ī*-stem noun in the Rigveda. And so if, as argued above, Hoenigswald's hypothesis is not plausible as a synchronic description of the latest reconstructible stage of Proto-Indo-European, the fact that it reveals an underlying order to the Edgertonian patterns of syllabicity suggests that perhaps there may be an element of diachronic truth to it, linking it to an earlier stage out of which Edgerton's patterns developed by regular phonological change.

If there is any truth to the assumption of an underlying pattern of biconsonantal clusters, then most of the exceptions must be examined individually, or at least category by category, and the examination of various inflectional categories is the purpose of the following chapters. However, one general exception may be studied here, the matter of the antevocalic syllabic resonants. No matter how these are represented, as *-TR̥Re-* or *-T*$_e$*Re-*, it is necessary to reconstruct a single resonant between vocoids. However, it is not necessary to assume that antevocalic resonants arose from early PIE syncope, nor that they originated at any time before the very close of the PIE period. Kuryłowicz (1935:90, 256) has shown that some antevocalic syllabic resonants result from the loss of a laryngeal between a syllabic resonant and a vowel—e.g. (though it is not Kuryłowicz' example) Skt. *bhuváḥ* gen. 'earth' < **bhuHos*, cf. nom. sg. *bhū́ḥ* < **bhuHs*. Borgstrøm (1949:152–3) explains other antevocalic syllabic resonants which were never followed by a laryngeal as the result of paradigm regularization. For example, in the PIE paradigmatic stem alternation between **dyēw-* (as in Gk. nom. sg. Ζεύς) and **diw-* (gen. sg. Δι[ϝ]ός), the vocalic *i* in the latter may have been extended analogically into the former, explaining why in Vedic meter, for instance, various case-forms of *dyāúḥ* 'heaven' must often (but not always) be scanned with antevocalic syllabic *y*—i.e., with *diy-*. For further discussion see Horowitz (1974:62–6), who argues that in instances where there was no original paradigmatic alternation between syllabic and nonsyllabic allophones (i.e. no *CR̥-C-* alternating with *CR-V-*) there is no variation like that between antevocalic *dy-* and *diy-* in Vedic *dyāúḥ*—e.g., indeclinable PIE **dwis* 'twice' is always reflected as a monosyllable (the example is Sihler's [1967]).

Accordingly, Borgstrøm and Horowitz both conclude that antevocalic syllabic resonants are relatively late PIE innovations. But it is not even necessary to rely on the effects of paradigm regularization to reach the same conclusion. The application of Sievers' law (Seebold's Anschlussregel) is remarkably haphazard in the Rigveda. For instance, given that there is no converse of Sievers' law operative in the Rigveda, when Seebold (1972:184–7) concludes that *-y-* is nonsyllabic in fully a quarter of its occurrences after heavy syllables in Rigvedic *devī*-type *ī*-stems, it is necessary to assume that the underlying form is nonsyllabic. (It is in fact nonsyllabic in 298 out of 375 instances after light syllables in these *devī*-type *ī*-stems.) When that synchronic assumption is regarded from the standpoint of probable historical causes, the implication is that syncope left the *-y-* nonsyllabic, and Sievers' law is an innovation arising later than syncope. The same conclusion follows in the vast majority of instances of antevocalic resonants in the Rigveda, most of which are frequently nonsyllabic. But as Seebold points out, antevocalic resonants do seem to be underlyingly syllabic in some instances: *-y-* in the *vr̥kī*-type of *ī*-stem is always syllabic, after light as well as heavy syllables, in all but three out of approximately 150 instances in the Rigveda. Here the sonorant is underlyingly syllabic because historically it was followed by a laryngeal: the suffix of the *vr̥kī*-type is **-iH-*, while in the *devī*-type it is *-yā-* < **-yeH-* (see below, §3.4). It will be assumed here that antevocalic resonants are never underlyingly syllabic, except when they were originally followed by a laryngeal—i.e., in all other instances they are underlyingly nonsyllabic, and may become syllabic by means of the Anschlussregel, or by the force of analogy; and in these instances the resonant will frequently be nonsyllabic. Thus the existence of antevocalic syllabic resonants does not contradict the pattern of biconsonantal clusters assumed under Borgstrøm's theory, since the pattern must be dated to an earlier period.

Given the general scholarly consensus that quantitative ablaut is the product of vowel reduction and loss at a time when Proto-Indo-European had a stress accent, and assuming with Borgstrøm and Hoenigswald that as a general rule PIE consonants appear in clusters of two between vocoids, the strong probability arises that Proto-Indo-European underwent some such process of iterative syncope as that attested in Old Irish. Some significant differences are of course inevitable. In Old Irish the stress always falls on the first syllable in nonverbal forms, and in verbs the stress falls on or near the first syllable, with the consequence that the iterative secondary stress rule always applies from left to right. On the other hand, in Proto-Indo-European the stress accent could fall on any syllable, meaning that vowel reduction could occur both before and after the accent—e.g., to Skt. 1. sg. pres. *émi* 'go' (<**[H]éy-mi*) cf. *imáḥ* (<**[H]i-més*). As further evidence of syncope after the accent Szemerényi (1980:105) remarks, 'Das vollstufige Wort **genu* "Knie" (lat. *genū*, heth. *genu*) z.B. erscheint als **gnu* in skt. *pra-jñu-* "säbelbeinig", av. *fra-šnu-* "die Knie nach vorne haltend", gr. πρόχνυ (aus πρόγνυ) "knielings" (eigtl. "die Knie vorn habend").' Therefore it seems more than likely that the PIE iterative secondary stress rule applied ambidirectionally starting from the one syllable in any word bearing the primary accent. The process may be demonstrated beginning from a hypothetical sequence of consonants with intervening vowels: *paratanakataspalasa.* Here *a* is to be distinguished from Borgstrøm's *ä.* He assumes there was just one vowel in early Proto-Indo-European, before the rise of qualitative ablaut and the coloration of vowels by contiguous laryngeals. Theoretically, then, the articulation of Borgstrøm's *ä* might vary freely over the entire range of possible vocoids. By contrast, *a* here is used simply to represent a vowel whose features are unknown. It may well be that before the onset of stress-related syncope, the protolanguage had a reasonably rich inventory of phonemically distinct vowels, and the reduction of all preserved unstressed vowels to [ə] resulted in the impoverished vowel system that is usually reconstructed once the effects of laryngeals and syllabic semivowels are factored out. This stage in the development of the protolanguage at which all vowels are represented as *a* will be designated PRE-INDO-EUROPEAN (abbreviated Pre-IE). The term is admittedly somewhat ambiguous, but there seems already to be a precedent—see, e.g., Cowgill 1984.

If the primary accent fell on the fourth *a* in the hypothetical form above, the secondary accent would have fallen on every second *a*, counting in both directions from the primary-accented *a*: *paràtanákatàspalàsa.* With the loss of all vowels bearing neither primary nor secondary stress, this form would yield *pràtnáktàsplàs.* Then after the loss of secondary stress, the primary-stressed vowel would appear in the next stage of reconstruction as a full-grade vowel, and *à* (now phonetically [ə]) would appear as $_e$ in *pr$_e$tnekt$_e$spl$_e$s.* This stage marks the beginning of Proto-Indo-European proper. There is nothing inherently implausible in these developments, since they are almost precisely the ones that affected Old Irish. It is true, there is not complete agreement among phonologists about whether mirror-image rules are phonologically natural—Chomsky and Halle (1968) do not use the mirror-image convention, though it is 'almost universally adopted since' (Sommerstein 1977:141)—but even if it turns out to be necessary to analyze the ambidirectional PIE rule into two discrete iterative stress assignment rules, that analysis is not inherently implausible, since there is precedent for assuming two distinct iterative stress assignment rules in a single phonological system, in Auca, an Ecuadorian language, as analyzed by Pike (1964).

Other differences between the syncopic processes of Old Irish and Proto-Indo-European include these:

1) In Old Irish the system of primary-stressed vowels remained relatively rich, while in Proto-Indo-European the impoverishment of the primary-stressed vowel system is reflected in the rise of qualitative ablaut. This, however, is a later development.

2) It appears that underlying consonant clusters (i.e. before syncope, as with the cluster *sp* in the hypothetical form above) are quite rare in Pre-Indo-European, while they are by no means infrequent in Pre-Irish. In this respect Proto-Indo-European bears greater typological affinities to Tonkawa than to Old Irish. It is perhaps surprising to find such consistently optimal syllable structure in Pre-Indo-European, but the evidence of the following chapters does not lend itself readily to another interpretation. It will be shown below (§5.1) that consistently open syllable structure does occur in some natural languages, and there is a natural explanation for its semblance in Pre-Indo-European—though in fact it is mere semblance, and some underlying clusters may after all be discerned.

After the period of syncope it appears that Proto-Indo-European underwent a course of development rather different from the subsequent history of Irish, though a few inevitable similarities are discernible, particularly with regard to analogical levelings of the sometimes extravagant paradigmatic alternations produced by syncope. The following account of subsequent developments in Proto-Indo-European is intended as a hypothesis to be justified in the following chapters.

Before the application of syncope all vocoids were phonemic, and doubtless their reflex *$_e$ under secondary stress was also a phoneme as long as stress assignment and syncope remained as rules in the grammar of Proto-Indo-European. But in the course of time a number of phonological changes led to the morphologization of the alternations produced by those rules, and as a result the reduced vowel lost its phonemic status—or, to be more precise, its status as an allophone of the vowel that appeared under primary stress as _e_ or _o_. The loss of phonemic status for *$_e$ was accomplished in part by the creation of syllabic consonants: between consonants, wherever PIE *_y_, *_w_, *_r_, *_l_, *_m_, *_n_, or *_H_ was flanked on one or the other side by *$_e$, the two sounds combined to form a syllabic allophone of the consonant. Certainly a phonetic change was involved: between consonants, *$_e$_y_ and *_y_$_e$ became [i], and *$_e$_w_ and *_w_$_e$ became [u]. With this change it became impossible to analyze [i] and [u] as anything but allophones of /y/ and /w/. At about the same time as the creation of [i] and [u], between consonants any other resonant or laryngeal combined with a flanking *$_e$ to produce *_r̥_, *_l̥_, etc., whatever the phonetic values of such allophones might have been.

The conversion of the biphonemic sequences of resonants and reduced vowels to monophonematic segments had profound consequences for the morphologization of quantitative ablaut. Although the creation of syllabic consonants did not itself utterly eliminate the phonemic status of *$_e$ in all environments, and simply convert it to a feature, it did radically alter the predictability of the distribution of *$_e$ as an allophone of */e/. That distributional disruption led naturally to the final breakdown of the allophonic relationship between full-grade vowels and the remaining instances of *$_e$ that had not combined with resonants and laryngeals—e.g., those instances of *$_e$ that appeared between oral stops. At least one other phonological change contributed to disrupting the allophonic relationship between *$_e$ and *_e/o_, and that was the conversion of stress accent to the characteristic IE pitch accent. Because pitch accent could not _phonetically_ condition the existing quantitative ablaut alternations, the conditioning became heavily morphologized and dissociated from the accent altogether, particularly after subsequent changes in the place of the accent in many forms. At the same time that the allophonic relationship between *$_e$ and *_e/o_ was breaking down, that between _R_ and _R̥_ was strengthened by the rise of a new and different purely phonological conditioning, because as a general rule (though for purely historical reasons), the resonants were syllabic between consonants, and otherwise nonsyllabic. (As suggested already above, that there was a time prior to this when resonant syllabicity was not automatically conditioned by interconsonantality is demonstrated by some forms examined in the following chapters that show loss of interconsonantal resonants before they could be vocalized —e.g. Vedic instr. sg. *áśnā* 'stone' < PIE _*Hek̂mneH_, §3.2.2.) On the other hand, the alternation between _*e/o_ and all remaining instances of *$_e$ was not predictable by means of purely phonological conditioning. Nor, apparently, did the alternation come to serve any useful morphological purpose. Since the conditioning of these remaining instances of *$_e$ thus grew opaque, in order to simplify the grammar and, in many instances, reduce heavily morphologized paradigmatic alternations, *$_e$ was regularly replaced by a full-grade allophone, the allophonic alternation between *$_e$ and _*e_ was discarded, and thus *$_e$ was finally eliminated altogether. These observations accord with Kiparsky's conclusions about the role of rule opacity in the historical loss of phonological rules.[12]

Given the assumption that reduced vowel segments did at one time exist in Proto-Indo-European, it seems an inescapable conclusion that they were systematically replaced by full-grade vowels. This, for instance, is also Brugmann's conclusion (1904:141; see also Kuryłowicz 1956:110; and Bailey 1970), and it follows naturally from the regular appearance of full-grade vowels between oral stops in environments where full grade is not expected—e.g. in participles such as Gk. πεπτός and Lat. *coctus* (§1.5). Where it appears that there do occur rare distinctive reflexes of reduced vowels in such environments, in at least some instances there is reason to believe that the reduced vowel is not the product of Pre-IE syncope, but is a later development. There is some reason, for instance, to believe that this is the case in regard to verbs with nasal infixes, such as Lat. *pandō*, Gk. πίτνημι, as discussed below.[13]

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[12] To forestall any objection it should be pointed out that technically 'opacity' in the sense used here does not coincide with Kiparsky's first formal definition of the property (1971:621–2), but it does fall within the bounds of his revised definition (1976:179). The precise definition is immaterial for the purpose intended here, because opacity, no matter what its definition, is merely one factor in a general tendency in language change, and it is the tendency instead that commands attention: 'Basically, we can say that rules are susceptible to loss *if the are hard to learn*. And one of the major factors that makes rules hard to learn is precisely *opacity* as defined above' (Kiparsky 1971:627). Whether or not they were opaque *sensu stricto*, the rules governing PIE syncope did grow difficult to learn, because of the interference of other phonological changes.

The environments in which *$_e$ was replaced by a full-grade allophone are then readily definable. Such restoration should be expected between obstruents (excluding **H*): *-T$_e$T-* > *-TeT-* (or *-ToT-*). Conversion to full grade should also be expected when *$_e$ appeared between a word-initial sonorant consonant and an obstruent, since the sonorant in this environment was not interconsonantal, and so could not be syllabic: *R$_e$C-* > *ReC-*. This does appear to be what happened when the initial resonant was **r*, **l*, **m*, or **n*: for instance, though reduced grade is to be expected in the past passive participle, roots with initial resonants generally have full grade, instead, e.g. Skt. *rakṣitá-* to the root *rakṣ-* 'protect', *raditá-* to *rad-* 'dig', *labdhá-* to *labh-* 'take', *naditá-* to *nad-* 'sound', etc. Exceptions appear to be due to the loss of an initial laryngeal, e.g. *r̥ddhá-* 'having thrived', to a root Pokorny (1959:1.26-7) reconstructs as **al-*. On the other hand, roots that begin with **y* or **w* generally do have reduced grade in the past passive participle, e.g. *iṣṭá-* to *yaj-* 'offer', *uktá-* to *vac-* 'speak', etc. But in roots that begin with two sonorants it is always the second that is syllabic (e.g. *viddhá-* to *vyadh-* 'pierce', and *vr̥kṇá-* to *vraśc-* 'cut up'), perhaps indicating a chronological difference between the general rise of syllabic resonants and the purely phonetic change of *$_e$*y*/*y*$_e$ and *$_e$*w*/*w*$_e$ to *i* and *u*. It should be pointed out, however, that in other morphological classes there are departures from the regularities exhibited by the past passive participles: in the root-stems and the *n*-stems, even initial **y-* and **w-* resist vocalization, e.g. Vedic instr. sg. *vācā́* 'speech' (rather than

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[13] It is suggested below (§4.3.1) that the syllabicity before the nasal infix is of post-syncopic origin; and so the possibility arises that reduced vowels had already been restored to full grade when weak-grade vocalism arose in forms like this one, in which the new reduced vowel was free to undergo different development from the original reduced vowel produced by syncope.

*_ucā́_) and abl. sg. _yaknáḥ_ 'liver' (rather than *_iknáḥ_), though once again perhaps these are due to paradigm regularization.

Likewise it should be expected that internally *$_e$ was changed to *_e_ (or *_o_) next to a sonorant when the sonorant was flanked on the other side by a vowel, since once again the sonorant could not be syllabic in such an environment: _-eR_$_e$_C-_ > _-eReC-_, and _-C_$_e$_Re-_ > _-CeRe-_. Normally one would not expect such sequences of segments to arise, given the syncope rule outlined above, which insures that every reduced vowel will be flanked on both sides by consonant clusters. However, such sequences might arise by analogical processes, and if they arose at a sufficiently early date they would naturally entail restoration of *$_e$ to full grade. Evidence for restoration in such analogically-induced sequences will be presented in the next chapter (passim, e.g. in regard to the nominative plural of Vedic _pánthāḥ_ 'path', §2.2). On the other hand, though word-initial _R_$_e$_C-_ usually became _ReC-_, apparently word-final _-C_$_e$_R_ always gives _-CR̥_. There is abundant evidence for word-final syllabic consonants in Proto-Indo-European, while the incidence of word-initial syllabic consonants is limited in a well-defined manner. This discrepancy between word-initial and word-final position should not be surprising: cf., for instance, the considerable effects of external sandhi on final consonants in Sanskrit, while the effects on initial consonants are quite few. It is possible that at one time initial _R_$_e$_-_ and final _-_$_e$_R_ did or did not form syllabic consonants according to external sandhi conditions, and that one or the other alternant, syllabic or with restored full grade, was generalized at an early date.

Finally it must be assumed that some sequences in which *$_e$ would be subject to replacement arose at a late date, and so did not undergo the normal change—e.g. in Lat. _pandō_, Gk. πίτνημι, as just remarked. It was also concluded above (§1.3) that there is no compelling reason to prefer either the notation _R̥R_ or $_e$_R_ to represent antevocalic syllabic resonants, and so if one chose the latter it would be with the assumption that *$_e$ was not restored to full grade here because it arose later than this restoration, antevocalic syllabic resonants being of relatively late origin, as concluded above. However, the former notation will be preferred in this work, simply to avoid any ambiguity in the use of the symbol *$_e$.

To summarize: At an early stage of the protolanguage, every second vowel in a given word, counting in both directions from the one vowel bearing primary stress, received a secondary stress. Subsequently every vowel bearing no stress was syncopated, and every one bearing secondary stress lost its stress and was reduced to a minimal vocoid $^*{}_e$. Thereupon, between consonants $^*{}_e$ combined with a flanking resonant or laryngeal to form a syllabic consonant. All other instances of $^*{}_e$, those that had not been so reanalyzed as features of syllabic consonants, were replaced by full-grade vowels. The following chapters will be devoted to making explicit the full implications and demonstrating the explanatory power of this theory of iterative syncope in Pre-Indo-European.

CHAPTER TWO: SIMPLE ATHEMATIC DECLENSION

2.0. INTRODUCTION. The plan of this and the following chapter is to examine each of the major PIE stem-classes of nouns and adjectives in order to demonstrate that the theory of iterative syncope outlined above (§1.9) accounts for many apparent irregularities of inflection. Preliminary to any internal reconstruction of the prehistory of PIE declension it is necessary to establish what PIE inflections ought to be assumed on the basis of the comparative method, and the following section will be devoted to this problem.

2.1. PROTO-INDO-EUROPEAN ATHEMATIC CASE ENDINGS. There is considerable disagreement over the reconstruction of PIE athematic case endings. Naturally it will not be possible to procede with internal reconstruction without making certain choices among the various proposals, and these choices will inevitably affect the results of internal reconstruction. To date, the most exhaustive attempt to reconstruct the entire system of PIE noun inflections on the basis of the comparative method is that undertaken by C.-J. N. Bailey (1970:17–94). A reconstruction that is more frequently cited in the relevant literature is that of Oswald Szemerényi (1980:143–76). There are works on PIE noun inflection more voluminous than these, but these are the most recent works to treat the entire set of case endings and draw their conclusions almost solely from the comparative method. It is doubtless a vain task to try to establish a set of endings agreeable to all comparatists, but it should at least be possible to insure that the following internal reconstruction is not entirely guided by idiosyncratic notions about the exact nature of the endings. And so an examination of Bailey's and Szemerényi's reconstructions, and an attempted resolution of the discrepancies between them, will serve to establish a set of case endings within the range of what constitutes general opinion.

Bailey (p. 93) concludes that the PIE athematic case endings of masculine and feminine nouns should be reconstructed as in Table 2.1a. The symbol + represents juncture. Neuters differ from masculines only in that the nom.-acc. ending for neuters is ∅, and in the plural it is *-_H_ or *-_ə_.

	sg.	du.	pl.
nom.	*-_s_	*-_e_	*-_es_
voc.	Ø	*-_e_	*-_es_
acc.	*-_m_, *-_m̥_	*-_e_	*-_ḿ̥s_
gen.	*-_ós_	*-_ó̄ws_	*-_óm_
abl.	*-_ós_		*+_bh((i)y)os_
dat.	*-_éy_		*+_bh((i)y)os_
loc.	Ø or *+_i_	*-_ó̄ws_	*+_su_
instr.	*-_éH_		*+_bhi(s)_

Table 2.1a. The case endings of Proto-Indo-European athematic masculine and feminine nouns, according to Bailey (1970).

In some repects Bailey's reconstructions seem too narrow. For instance, he specifies whether resonants in these endings can be syllabic or nonsyllabic, or whether they can alternate in this respect. This practice leads, for instance, to the claim that the resonant in the acc. pl. ending is underlyingly syllabic, and loses its syllabicity after syllabic resonants by means of a regular phonological rule. This claim presents theoretical difficulties, because in effect it makes *_m̥_ a phoneme rather than an allophone of /m/. Rather, underlyingly the resonant ought to be nonsyllabic (i.e., _minus_ is the unmarked value for syllabicity in resonants), since the value of the syllabicity feature may be changed to _plus_ by natural phonological rule, while it is not possible in generative notation to write a very natural rule that does just the opposite in all requisite environments. Moreover, Bailey's reconstruction demands unwarranted assumptions about the origin of PIE noun inflection. Specifically, if the resonant is underlyingly syllabic, and changes its syllabicity value when added to some stems, then the implicit assumption is that case endings were not added to nouns until after the period of syncope that gave rise to the syllabic resonants. That assumption is probably incorrect, and is at any rate unwarranted. It will be preferable to follow Szemerényi (p. 146), who identifies the accusative plural desinence as _*-ns/*-n̥s_, with the understanding that the distribution of the two allomorphs is determined by phonological environment. It should be noted that Bailey reconstructs acc. pl. _*-m̥s_ rather than _*-n̥s_, though the comparative method strictly only justifies the latter, on the basis of the assumption that the _s_ here is a pluralizing suffix added to the same accusative ending found in the singular. Hirt (1921-37:3.59; see also Brandenstein 1952a:10) seems to have been the first to suggest this analysis. Szemerényi (p. 149) agrees, and so this is the assumption that will be adopted here. On the peculiar accent of the accusative plural, see below (§2.2).

Likewise Bailey's reconstruction of the genitive singular ending as _*-ós_ is rather specific in comparison to Szemerényi's _*-es/*-os/*-s_, which is more in line with conventional views. Bailey's reconstruction does seem excessively narrow in excluding _*-s_, which is well attested in _i-_, _u-_, and diphthongal stems. These exceptions he regards as 'reshapings' (p. 44) or clitics (p. 46), but this explanation is unconvincing: declension of these stem classes is sufficiently idiosyncratic to affirm their antiquity, and there is no apparent reason genitives of these classes should have been clitics when no other genitives were. It is simpler to assume that gen. sg. _*-os_ originally alternated with _*-s_ on a regular basis, under conditions yet to be determined. The present study represents an attempt to determine those conditions. The situation is somewhat different as regards Bailey's rejection of a gen. sg. _*-es_: this does have reflexes in Italic, Germanic, and Balto-Slavic, but they are still infrequent, and

Bailey might well be right that the vocalism here is the result of paradigmatic leveling. Since the question is of no substance as regards the theory of syncope advanced here, for the sake of conservatism it will be best to adopt Szemerényi's reconstruction **-es/*-os/*-s* for the genitive singular.

The ablative singular of athematic nouns provides no independent evidence in regard to syncope, since it is identical to the genitive singular; and so it may safely be disregarded.

For the so-called middle cases of the plural, or those using the middle stem (also called the 'concrete' cases—for the significance of this term see Kuryłowicz 1964:179), Bailey reconstructs endings preceded by juncture (+), and considers the endings enclitic. It is indeed the standard view that the plural desinences of the ablative, dative, locative, and instrumental cases are of late origin. For instance, Lehmann (1958:182) points out that 'their endings differ from dialect to dialect', e.g. Skt. dat. pl. *-bhyaḥ*, Lat. *-bus* : Lith. *-m(u)s*, Runic *-umR*, and 'the plural endings for these cases are not attested in Hittite. Sandhi phenomena of Sanskrit support the assumption that these endings are late; that of the locative plural of the *s*-stems, for example, indicates that this construction belongs in the sphere of derivation rather than inflection.' In a footnote he adds,

> The sandhi change of *-s-* to *-ḥ-* in the locative plural of Sanskrit *as*-stems, e.g. *manaḥsu* from *manas* 'mind' is that expected in external sandhi, as is the change of *-as-* to *-o-* in the instrumental plural, e.g. *manobhis*.
>
> The editors of the pada text of the Rigveda wrote separately the endings of the instrumental, dative, ablative, and locative plural, distinguishing these endings from roots as they did second from first elements of compounds.

For a similar opinion see Kuryłowicz (1935:167), who adduces evidence for the lateness of the middle case endings in the fact that they are not accented when the stem is a dis-, tri-, or polysyllabic oxytone (e.g. Vedic dat. pl. *mahádbhyaḥ* 'great'), though the weakest cases of such stems do accent the desinence (gen. sg. *mahatáḥ*). This evidence collectively indicates that the endings of these plural concrete cases at the time of syncope must have been independent words—perhaps adverbs (Kuryłowicz 1964:200). The same development is attested in some historical languages, e.g. by the creation of the illative, allative, and adessive cases in Baltic. Perhaps further evidence that these desinences were added after the period of syncope is that most of these cases show weak grade in both stem and case suffix, while, in general, other cases will show full grade in one or the other, depending on where the accent fell. Since these case endings are apparently a late innovation, they must be disregarded in the reconstruction of the effects of iterative syncope on noun paradigms.

Bailey's reconstruction of the instrumental singular ending as **-éH* is preferable to Szemerényi's **-e*/**-o* (which he acknowledges could also appear as **-ē*/**-ō*, p. 149). This seems to account best for the Skt. desinence *-ā*, which is in free variation with *-ī* (<**-iH*) in the feminine *i*-stems. Bailey and Szemerényi are in agreement that alternative instr. sg. endings are **+bhi* and **+mi*, which resemble the plural endings. These latter endings are of late provenance, added probably at the same time that the concrete cases were formed, as Bailey's reconstruction of juncture before them indicates.

The nom.-voc.-acc. dual desinence presents particular difficulties of analysis, since at least two discrete inflections, **-e* and **-y*, seem to have been involved. Bailey's solution is to assume that the ending was originally **-e* everywhere except in feminine and neuter thematic stems.[1] This may well have been the case, though it seems unlikely that **-i-e* gave **-ī* in the *i*-stems, and **-u-e* gave **-ū* in the *u*-stems, as Bailey asserts (p. 72). Considerable analogical disturbances are required to account for the attested reflexes beginning from this reconstruction, but such disturbances seem necessary under any analysis. The one real debatable point is whether the original distribution Bailey posits produces sufficient irregularities of inflection to have induced such widespread analogical changes. Szemerényi reconstructs **-e* and **-i* (along with **-ī*, apparently on the basis of the Indic evidence), but without attempting to define the original distribution. Likewise in the dual Bailey reconstructs **-óws* for both the genitive and the locative, while Szemerényi hesitantly suggests **-ous* or **-ōs* for the genitive, and **-ou* for the locative. Bailey declines to reconstruct the remaining dual endings, for insufficient evidence. Since there is not sufficient evidence for a very firm conclusion about the genitive and locative, and since the original distribution of nom.-voc.-acc. **-e* and **-y* is rather debatable, no conclusions about syncope based on these case forms could be very firm. Moreover, it is seriously questioned whether the entire dual category has any real antiquity in Proto-Indo-European. Watkins (1969:46), for instance, points out that all IE dual pronouns derive from plural ones, and so the dual number is not very old in the one lexical category in which distinctive forms most certainly ought to be attested. The dual category generally will be disregarded in the remainder of this study, as this can be done without severely detracting from the validity of its conclusions.

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[1] The summarizing table Bailey presents on p. 93 seems to imply that **-y* was the ending for all feminines and neuters, including athematic stems, but this contradicts the conclusions he explicitly states on pp. 72 and 75.

Perhaps the most obscure of the PIE cases is the locative singular. In some instances the case-form is simply the strong form of the bare stem, with *e*-quality of the stem vowel.[2] This situation is particularly common in the liquid and nasal stems. Usually, however, there is an additional **-i* attached to this stem, suggesting an affiliation with the dative. The thematic stems indicate that **-i/-y* was regarded as the usual locative desinence, because the thematic ending **-oy/-ey* was formed by adding the athematic ending to the theme vowel, as explained below (§3.4). Accordingly Bailey is reflecting general opinion when he concludes that the inflectionless strong-stem locative is an archaic formation, as old as the nominative, vocative, accusative, and genitive singular formations (p. 12), and the forms with **-i* are younger. The locative singular will be studied in detail below (§2.4), and another analysis suggested..

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[2] The Proto-Indo-European strong cases (those in which stems with quantitative apophonic alternations had full grade in the stem rather than the case ending) apparently were the nom., voc., acc., and loc. singular, the nom., voc., and acc. dual, and the nom. and voc. plural. The rest were weak cases. It is a consequence of assumptions about juncture and the concrete cases espoused in this chapter that it is necessary to conclude that the distinction between middle and weakest cases (i.e. the cases with and without syllabicity of a stem-final resonant, respectively) arose considerably later than the strong/weak stem alternation created by syncope: the middle cases are precisely the concrete cases of the plural (and the dual if the Indo-Iranian desinences are not a dialectal innovation—except that the locative dual is not a middle case). Note that the locative singular is generally thought to have been a strong case in Proto-Indo-European, while it is one of the weakest in Sanskrit: this problem is discussed in detail below (§2.4).

In regard to one desinence perhaps neither Bailey's nor Szemerényi's analysis will suffice. The genitive plural ending in Celtic and Slavic derives from **-om* with short *o*, while elsewhere it apparently derives from **-ōm*, e.g. Skt. *-ām*, Av. *-ąm*, Gk. -ων, Lith. *-ų̄*, NWGmc. **-ōm*. Bailey·chooses **-om* as the original desinence, and ascribes the type with long vowel to the analogical influence of the *o*-stem desinence, which shows contraction of **-om* with the thematic vowel. This explanation is unlikely for a variety of reasons. In particular there is no very good motivation for the analogical spread of the *o*-stem desinence if the athematic nouns were regular, showing only **-om*. The comparable development Bailey cites (p. 85)—the spread of the masc. nom.-voc.-acc. dual ending from thematic to athematic nouns in Indo-Iranian and thematic neuters in Greek—depends upon Bailey's hypothetical reconstruction of the dual, and so this evidence is not compelling. If, on the other hand, in the genitive plural the athematic nouns showed an alternation between **-om* and **-ōm*, that alternation would provide sufficient motivation for the IE languages independently to have leveled one or the other variant. Moreover, the Vedic gen. pl. ending *-ām* appears to be the product of a late contraction rather than an early one such as produced the long vowels of thematic endings, since the Vedic desinence must often be scanned as two syllables. The same is true of the Gathic Avestan ending. This is not true of other thematic endings with long vowels, such as Vedic abl. sg. *-ād*. These difficulties are remediable if it is assumed that the genitive plural ending was **-oHm̥* (originally alternating with **-oHm* in external sandhi: see below, §2.2). This would explain why Vedic and Gathic Avestan scansion indicates noncontraction, given that some laryngeals were preserved into the Indo-Iranian period. Dissyllabic scansion of such vowels seems always to be due to loss of an intervocalic laryngeal: Kuryłowicz (1935:33–40) provides many examples from other morphological contexts, e.g. Vedic 3. pl. pres. imp. *pā́ntu* (**peH-ont-*, to the root *pā* 'protect', cf. Gk. πῶυ 'flock of sheep') must be scanned as *paantu*; and in superlative *déṣṭha-* (<**deH-ist[h]-o-*), to the root *dā-* 'give', the *e* is dissyllabic. Moreover, the theory of syncope predicts that **-o-Hm̥* > **-ōm* will alternate with **-Hom* > **-om* in the athematic genitive plural (see §§2.3, 3.4), and this alternation provides the very sort of irregularity that could produce the analogical leveling in opposite directions that is found in the genitive plural in the historical IE languages.

Incorporating the foregoing modifications of Bailey's and Szemerényi's reconstructions, and eliminating from consideration all desinences likely to have been added to nouns after the period of syncope, the case endings of PIE athematic noun classes may be represented as in Table 2.1b. The phonemic representations of the desinences are followed by what at this point appear to be the actually occurring allomorphs. It is part of the obligation of internal reconstruction to explain why some theoretically possible allomorphs (e.g. *[-os, -s] for the nominative plural) do not actually occur. The theory of syncope suggests some plausible explanations.

	sg.	pl.
nom.	/-s/ [-s]	/-es/ [-es]
voc.	Ø	/-es/ [-es]
acc.	/-m/ [-m, -m̥]	/-ms/ [-ms, -m̥s]
gen.	/-es/ [-es, -os, -s]	/-eHem/ [-oHm̥, -oHm, -Hom]
dat.	/-ey/ [-ey]	
instr.	/-eH/ [-eH, -oH, -H]	

Table 2.1b. The inflectional endings of PIE athematic nouns: a synthesis of the discussion in §2.1.

2.2. THE ROOT-STEMS. The root-stems will be examined first, because although the evidence they provide for iterative syncope is small, with them it is relatively easy to demonstrate how syncope worked. As is well known, IE athematic declensional stems show ablaut alternations such that in the strong cases a full-grade vowel will appear in the stem, with weak grade in the desinence, while in the weak cases the desinence is in full grade, with an accompanying weakening of the stem. That this ablaut alternation is due to alternation in the place of the accent is demonstrable from accentual phenomena in various languages: in Vedic Sanskrit, for instance, although polysyllabic stems have acquired a fixed, columnar accent, monosyllabic stems still accent the desinence in the weak cases and the stem in the strong. Similar evidence can be found, with varying degrees of clarity, in Greek, Baltic, and Slavic.

Although Vedic root-stems preserve the PIE accent alternations, they have for the most part given up the corresponding ablaut alternations found in some polysyllabic stems. There are, however, a few exceptions, nearly all of them roots ending in resonants. No other language preserves ablaut alternations in the root-stems any better than Vedic, though in some instances other languages provide corroborating evidence for the Vedic alternations. A straightforward example is Vedic *dvā́r* 'door', acc. pl. *dúraḥ*, also once *duráḥ* and *dvā́raḥ*.[3] Only acc. sg. *dvarəm* and loc. sg. *dvarə* are attested in Avestan. Thematized forms in other languages exist for both the strong and the weak stem, e.g. strong in Lat. *forēs* 'folding-doors' and Alb. *derë*, weak in Gk. θύρα and OE *dor*. Presumably the middle stem was PIE **dhwr̥-*, and this seems to be the basis for OCS *dvьri*—see Brugmann (1897–1916:2.1.133). The Vedic paradigm of *dvā́r* is presented in Table 2.2a, with earlier reconstructions at various stages in the development of the protolanguage. Not all the Vedic forms are actually attested, but the inflection is not in doubt. The early PIE forms are those to be expected immediately after the application of syncope, before the rise of syllabic consonants. The Pre-IE forms are the ones to be expected immediately before syncope. Before

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[3] Brugmann (1897–1916:2.1.133) explains the initial *d* instead of *dh* as stemming from the cases in which the desinences began in *-bh-*, where Grassmann's law would have applied. The cases with *bh*-desinences would be of greater importance if this word was not used in the singular in Proto-Indo-European, as Brugmann is almost certainly right to assume.

		Vedic	late PIE	early PIE	Pre-IE
sg.	nom.	*dvā́r*	**dhwṓr*	**dhwórs*	**dhawára-s(a)*
	voc.	*dvar*	**dhwor*	**dhwór*	**dhawár(a)*
	acc.	*dvā́ram*	**dhwór-m*	**dhwórm*	**dhawára-m(a)*
	gen.	*duráḥ*	**dhur-ós*	**dh$_e$wrós*	**dhàwará-s(a)*
	dat.	*duré*	**dhur-éy*	**dh$_e$wréy*	**dhàwará-y(a)*
	instr.	*durā́*	**dhur-éH*	**dh$_e$wréH*	**dhàwará-H(a)*
pl.	nom.	*dvā́raḥ*	**dhwór-es*	**dhwór(+e)s*	**dhawára-s(a)*
	acc.	*dúraḥ*	**dhúr-n̥s*	**dh$_{é}$wr$_e$m(+s)*	**dhàwará-m(a)*
	gen.	*durā́m*	**dhur-óHm*	**dh$_e$wróHm*	**dhàwará-Ham(a)*

Table 2.2a. Paradigm of Vedic *dvā́r* 'door', with reconstructions from various stages in the development of the protolanguage.

discussing the individual case-forms, it will be useful to provide a general outline of the assumptions underlying the Pre-IE reconstructions and the effects of syncope.

The Pre-IE reconstructions in Table 2.2a generate several important claims about PIE noun inflection. One claim is that full-grade vowels in the endings of weak cases originally belonged to the noun stem, but were eventually transferred to the case ending by morphemic reanalysis. For example, though in the late PIE reconstruction the genitive singular is analyzed into a stem **dhur-* and an ending **-os*, in fact before syncope the vowel of the ending belonged to the stem rather than the ending. It follows then that originally no Pre-IE case ending was accented—all were enclitic—and that is a highly plausible assumption because it eliminates what has always been a troublesome typological oddity about Proto-Indo-European. It is generally assumed that PIE nouns were originally uninflected. Wheeler (1898:538) provides evidence for this view by reference to PIE patterns of compounding: 'ἀκρόπολις (and not *ἀκράπολις), λογοποιός (not *λογομποιός), for instance, present on the one hand an adjective without concord, on the other a noun without case-ending (accus.).' Moreover, the PIE inflections are usually thought to have been separate words at one time, and if that is so, they were undoubtedly function words of one sort or another, probably demonstratives and postpositions derived from adverbs.[4] Yet it is words bearing real semantic weight, especially nouns, rather than function words, that tend to carry the strongest stress in languages with stress accent. It would be an unexpected development for a noun in such a language to become proclitic to a following function word.[5] This analysis obviates that difficulty, keeping the accent consistently on the original stem itself. (On the cause of the alternation in the place of the accent, see below, §3.1.) Moreover, the assumption that the accented vowel of the weak cases originally belonged to the desinence rather than to the noun stem calls for an internal typological inconsistency. PIE roots beginning with vowels are sufficiently uncommon to have led some scholars to believe that no PIE root originally began with a vowel. It is not necessary to share this view in order to recognize the peculiarity of finding that *all* weak-case desinences began with a vowel—even though case endings, like roots, are generally believed to have been separate words at one time. Moreover, the structural difference between root-morphemes and weak-case desinential morphemes is so consistent that historically it must have a phonological cause. And so the assumption that the vowel belonged to the noun stem rather than to the desinence better accords with usual PIE morpheme structure.

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[4] An early analysis of the nom. sg. **-s* as pronominal in origin is advanced by Jacobi (1897:114), in agreement with Bopp (1857–61) and Schleicher (1866). Biese (1950) argues that this desinence reflects an early PIE definite article **so*. Kuryłowicz (1935:162), in agreement with Finck (1907), derives the acc. sg. ending from a postposition, and Hirt (1921–37:3.166–7) sees some case endings as postpositional or pronominal in origin. Specht (1944:353–86) argues that the declensional endings reflect pronominal stems and deictic particles, while Shields (1982:40) derives them from adverbial particles. Heller (1957) offers a similar account of the origin of conjugational endings.

[5] Lehmann (1958:192–5) explains the retracted accent of the weak cases as due to the modifying relationship of the stem element to the inflectional element, and he compares the accentuation of tatpuruṣa and bahuvrīhi compounds in Vedic (his examples are *jīva-loká-* 'place of the living' and *jīvá-putra-* 'one who has living sons'): the accent is conditioned on the basis of which element is the modifier and which the modified. Still, in these forms the two elements are of equal semantic weight, and so modification may apply in either direction. It is difficult to imagine how a noun could modify a following pronoun or adverbial particle, or even carry less sentence stress. (See below, §3.1, on the relative accentual prominence of nouns and pronouns in Pre-Indo-European.) The non-singular concrete cases of Proto-Indo-European are not an exception to this observation: in Vedic these desinences are regularly accented only in some monosyllabic stems, and their non-accentuation in dis-, tri-, and polysyllabic oxytones points to late-developed analogical regulation of these accentual alternations—see above (§2.1) in reference to Kuryłowicz 1935:167.

Accordingly it is a claim of this analysis that no PIE case ending, strong or weak, originally began with a vowel. Moreover, it appears from these data that none ended with a vowel. This clearly cannot have been the original state of affairs. If, for instance, the genitive singular of Pre-IE 'door' is reconstructed as **dhawara-s* (where *a* represents a vowel of unknown quality), this leaves only **-s* for the inflectional ending, and **s* without a vowel is unlikely originally to have stood on its own as a separate word. The simplest solution is to assume that the original ending was **-sa* (for a similar view see Jacobi 1897:114; and Biese 1950), and that final vowels have consistently been lost. It will be assumed here that prior to the application of the secondary stress rule and subsequent syncope, Pre-Indo-European passed through a period of general apocope entailing the loss of all unstressed final vowels—that is, all those without what later came to be the primary stress.[6] Abundant evidence for this apocope will be found in the course of this study. Apocope is

[6] The precise chronology of apocope and stress assignment is not actually determinable, since it is still possible that apocope applied after the assignment of secondary stress. Presumably a vowel with any sort of stress would not be apocopated, but it is possible that no Pre-IE final syllable had secondary stress, even after stress assignment: compare the situation in Southern Paiute, where although an iterative rule stresses every even-numbered vowel from left to right, no final vowel is ever stressed (Sommerstein 1977:173 n. 3). Suffice it to say as a surface generalization that Pre-IE secondary stress never interferes with apocope, while primary stress does.

indicated in the table by parentheses enclosing all final vowels. For the sake of brevity, such parenthesized vowels may usually be omitted in Pre-IE reconstructions.

Some of the individual case-forms of *dvăr* in the table bear comment:

PIE nom. sg. **dhwṓr* derives from **dhwórr* < **dhwórs* according to Szemerényi's explanation of PIE lengthened grade (1980:106–11; see also 1960:135–6; and 1962:12–3, 21). The idea is that word-final *-*s* was assimilated to the stem-final consonant in the nominative singular of liquid, nasal, and dental obstruent stems—in other words, wherever the stem ended in a consonant homorganic with *s*. The combination *short vowel* + *geminate consonant* later yielded *long vowel* + *nongeminate.* This analysis has several practical and theoretical advantages: it allows the reconstruction of simple *-*s* as the masculine and feminine nominative singular inflection in liquid, nasal, and dental stems, and this is the inflection other athematic stems do suggest; it accounts for the complementary distribution of *-*s* and lengthened grade in athematic nominatives; it explains at least in part why there are no geminate consonants in Proto-Indo-European; and it accounts for some long vowels not of laryngeal origin, outside of athematic nominatives, e.g. in **wīk̂m̥t-* 'twenty', **trīk̂omt-* 'thirty', and **kʷetwr̥̄k̂omt-* 'forty', which show *-*īk-* and *-*r̥̄k-* from *-*ik̂k̂-* and *-*r̥k̂k̂-*, assimilated from *-*i-dk̂-* and *-*r̥-dk̂-* (the decad-forming suffix here is the same root found in **dek̂m̥* 'ten', a different ablaut alternant).

The PIE nominative plural is anomalous inasmuch as it shows two full-grade vowels. For that reason, as Winter (1969:216) remarks, forms like **dhwores* must be innovations arising later than the morphologization of quantitative ablaut. It is for the same reason that, for instance, thematic inflectional forms, which may show two full-grade vowels throughout the paradigm, are thought to be more recent than athematic forms (see, e.g., Lehmann 1958:188). The reason the nominative plural ending *-*es* was extended analogically to all athematic stems, it appears, is that after syncope the nominative singular and plural had fallen together phonologically, and it became necessary to redifferentiate them. (Perhaps the nominative singular and plural endings were originally distinguished by different vowel qualities in Pre-Indo-European, though that is hardly demonstrable now.) The original state of affairs, in which the nominative plural ending would have been reduced or syncopated, is reflected in the *devī*-type of *ī*-stem, where zero grade in the nominative plural desinence is still preserved, without analogical disturbance (e.g. nom. pl. *devī́ḥ* 'goddess').

In the accusative singular there is an important discrepancy between the PIE reconstruction and the actual reflex in Vedic. Iterative syncope calls for PIE **dhworm*, when in fact Vedic *dvā́ram* seems to require **dhworm̥*. Actually, however, the analysis under syncope resolves a persistent problem, since under the standard analysis the Vedic ending *-am* has always been considered analogical. The difficulty is that final **-m̥* regularly gives *-a* in Indo-Iranian (e.g. Vedic *saptá* 'seven', *dáśa* 'ten', Av. *hapta, dasa* : Lat. *septem, decem*), and yet the accusative singular ending **-m̥* regularly gives Indo-Iranian *-am*, e.g. in Vedic acc. sg. *pitáram*, GAv. *pitarə̄m* 'father'. Wackernagel and Debrunner's explanation is that the final *-m* in the Sanskrit ending appeared 'unter dem Einfluss der parallelen Formen mit phonetischem *m*' (1896–1954:1.12), perhaps referring, for instance, to the thematic ending. Brugmann (1897–1916:1.1.402–3) disagrees, but also offers an analogical explanation: the *m* originally appeared in external sandhi before vocalic initials, and was later generalized. But de Saussure (1879:40-2) offers a different explanation, and surprisingly, on independent grounds he arrives at pre-Vedic **patarm* (with *a* for *ə*), which corresponds precisely to the **pH̥term* that the theory of iterative syncope predicts. He argues that Vedic *saptá* and the like reflect PIE forms with **-m̥*, while the *m* was originally nonsyllabic in the etymon of *pitáram*. He contends that this explanation also accounts for the loss of the accusative singular ending in Gothic athematic nouns, e.g. *fadar* 'father', as opposed to *sibun* 'seven'.[7] This explanation once again requires recourse to analogical leveling of a single variant in external sandhi, because, as de Saussure points out, a form such as pre-Vedic **bharantm* would necessarily have had syllabic **-m̥* before consonantal initials, and in pausa. Now in fact although final nonsyllabic **-m* might well have remained consistently nonsyllabic in a form like **dhworm*, it is hardly believable that it could have done so in a great many other forms. For example, although it might be nonsyllabic before vowels in external sandhi in a form like **pédm* (Lat. *pedem* 'foot'), it certainly must have been syllabic before consonants and in pausa. If the explanation under iterative syncope is to be credible, it must be assumed that the syllabicity of the morpheme alternated according to environment. But that in fact is a highly plausible assumption. It was pointed out above (§2.1) that the usual reconstruction of the accusative plural ending as **-m̥s* is unlikely because it implies that the consonant is underlyingly syllabic, thus essentially granting **m̥* the status of a phoneme rather than an allophone of /m/. The same reasoning applies to the accusative singular: it ought to be assumed that the ending **-m* is underlyingly nonsyllabic (the unmarked value for syllabicity in resonants, since the environment for the syllabic allophone is readily predictable), and that it assumes its syllabic allophone between consonants in external sandhi—or, to be more precise, when it is flanked by consonants of equal or greater aperture, on some such strength scale as that proposed by Hooper (1976:206; see also Murray and Venneman 1983). Evidence for this claim is provided by forms like Av. acc. sg. *ząm* 'earth' and *zyąm* 'winter' (=Skt. *kṣâm*), discussed below. It is to be assumed, then, that the athematic accusative singular ending continued to alternate throughout the PIE period in regard to syllabicity, and it was only on the dialectal level, after the breakdown of the allophonic relationship between syllabic and nonsyllabic consonants, that a single allophone was generalized.

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[7] A difficulty with the Gothic evidence is that PGmc. **faðer(m)* will not account for OIcel. acc. sg. *fǫður*, for which Heusler (1967:36) reconstructs North Germanic **faðaru* < PGmc. **faðerum* < PIE **pətérm̥*. Still, it is possible that **-u(m)* was added analogically in North Germanic, assuming that East Germanic shows leveling in the opposite direction. It is difficult otherwise to account for the reflex *-u* of PIE **-um* in the accusative singular of Gothic *u*-stems.

If the final **-m* of the accusative singular ending showed syllabicity alternations, so must that in the genitive plural ending. Just as *-am* was generalized for the accusative singular in Proto-Indo-Iranian, so was **-aHam*, before the loss of laryngeals, and that explains the frequent dissyllabic scansion of the genitive plural ending in Indic and Avestan (§2.1).

The accusative plural of athematic stems presents an especial peculiarity, as in most stem types it contains no full-grade vowel. Bailey, reconstructing the acc. pl. desinence as **-ḿ̥s*, concludes that this case 'shows clearly the incorrectness of attributing all zero grades in Proto-Indo-European to accentual phenomena' (1970:82). Undeniably, the accusative plural contradicts the pattern found in the cases of the singular, where there is full grade in the stem or the case ending, depending on which of the two carries the accent. But the standard view, that PIE vowels are lost under lack of stress, must not be rejected lightly, since to do so is to cast aside phonological probability: the typology of natural languages indicates that syllabic consonants ought only to arise from syncope (see §1.5, in reference to Bell 1978), and vowels in natural languages are not lost under full stress. There is then a strong initial probability that **-ḿ̥s* does not reflect the original state of affairs. In order to establish a plausible explanation, it will be useful to review here briefly the major evidence regarding the accent of the accusative plural.

The Greek evidence overwhelmingly favors a reconstruction with accented stem. Wherever in Greek the accent shows the same alternations between stem and suffix that Sanskrit strong/weak stem alternations indicate ought to be assumed for the Indo-European protolanguage, the accusative plural accents the stem rather than the case ending. The alternation is attested in a variety of stem types, as represented in Table 2.2b, showing an obstruent stem (φλέψ 'vein'), a nasal stem (φρήν 'mind'), two liquid stems (ἅλς 'salt' and ἀνήρ 'man'), an *i*-stem (Att. οἶς 'sheep'), and a diphthongal stem (Hom. νηῦς 'ship'). In the last instance, Homer also has a parallel paradigm with ε for η in most case forms, but the accent is the same; and paradigms in Doric and in Herodotus agree with Homeric in regard to accent. Corresponding to ἀνήρ, Homeric θυγάτηρ 'daughter' has acc. pl. θυγατέρας, agreeing with acc. sg. θυγατέρα and nom. pl. θυγατέρες, as against gen. sg. θυγατρός, dat. sg. θυγατρί, gen. pl. θυγατρῶν. Other archaic kinship nouns (πατήρ, μήτηρ, etc.) are not attested in the accusative plural in Homer.

Just as in Greek, the Baltic evidence indicates accentuation of the stem rather than the suffix in the PIE accusative

sg.	N	φλέψ	φρήν	ἅλς	ἀνήρ	οἶς	νηῦς
	V	φλέψ	φρήν	ἅλς	ἄνερ	οἶ	(unattested)
	A	φλέβα	φρένα	ἅλα	ἄνδρα	οἶν	νῆα
	G	φλεβός	φρενός	ἁλός	ἀνδρός	οἰός	νηός
	D	φλεβί	φρενί	ἁλί	ἀνδρί	οἰί	νηί
du.	NVA	φλέβε	φρένε	ἅλε	ἄνδρε	οἶε	(unattested)
	GD	φλεβοῖν	φρενοῖν	ἁλοῖν	ἀνδροῖν	οἰοῖν	(unattested)
pl.	NV	φλέβες	φρένες	ἅλες	ἄνδρες	οἶες	νῆες
	A	φλέβας	φρένας	ἅλας	ἄνδρας	οἶς	νῆας
	G	φλεβῶν	φρενῶν	ἁλῶν	ἀνδρῶν	οἰῶν	νηῶν
	D	φλεψί	φρεσί	ἁλσί	ἀνδράσι	οἰσί	νηυσί

Table 2.2b. Representative paradigms of Greek athematic nouns with movable accent.

plural of nouns with movable accent. Table 2.2c presents Lithuanian paradigms of *širdìs* 'heart' (*i*-stem), *sūnùs* 'son' (*u*-stem), *akmuõ* 'stone' (*n*-stem), and *duktė̃* (*r*-stem). In a few instances these paradigms indicate accentual innovations since the PIE period, most notably in the dative singular (the Slavic evidence suggests that this change occurred quite early), but also in the dative plural, and in the nominative singular of *i*- and *u*-stems.

Some Slavic material corroborates the Baltic evidence indicating an accented stem in the accusative plural. For instance, in the plural of Russian *i*-stems, alternation in the place of the accent is preserved, showing agreement between the nominative and accusative, as against the other cases: the plural of Russ. *kost'* 'bone' is declined in Table 2.2d. In Serbo-Croatian and Slovenian the alternation in the place of the accent is not preserved, but a difference in the type of intonation encountered points to the original distinction. The plurals of Slovenian *kǫ̂st* 'bone' and Serbo-Croatian *stvâri* 'thing' (both *i*-stems) are declined in Table 2.2d. In all these Slavic forms, the dative, locative, and instrumental do not show accentuation of the PIE case ending, which has been

sg.	N	*širdìs*	*sūnùs*	*akmuõ*	*duktė̃*
	V	*širdiẽ*	*sūnaũ*	*akmeniẽ*	*dukteriẽ*
	A	*šìrdį*	*sū́nų*	*ãkmenį*	*dùkterį*
	G	*širdiẽs*	*sūnaũs*	*akmen(è)s*	*dukter(è)s*
	D	*šìrdžiai*	*sū́nui*	*ãkmeniui*	*dùkteriai*
	L̇	*širdyjè*	*sūnǔjè*	*akmenyjè*	*dukteryjè*
	I	*širdimì*	*sūnumì*	*akmenimì*	*dukterimì*
du.	N	*šìrdi*	*sū́nu*	*ãkmeniu*	*dùkteri*
	D	*širdìm*	*sūnùm*	*akmenìm*	*dukterìm*
	I	*širdim̃*	*sūnum̃*	*akmenim̃*	*dukterim̃*
pl.	N	*šìrdys*	*sū́nūs*	*ãkmen(e)s*	*dùkter(e)s*
	A	*šìrdis*	*sū́nus*	*ãkmenis*	*dùkteris*
	G	*širdžių̃*	*sūnų̃*	*akmen(i)ų̃*	*dukter(i)ų̃*
	D	*širdìm(u)s*	*sūnùm(u)s*	*akmenìm(u)s*	*dukterìm(u)s*
	L	*širdysè*	*sūnu(o)sè*	*akmenysè*	*dukterysè*
	I	*širdimìs*	*sūnumìs*	*akmenimìs*	*dukterimìs*

Table 2.2c. Paradigms of some Lithuanian athematic nouns.

lost; rather, the point is that the intonation of these cases is not that of the nominative and accusative, but is in agreement with the genitive.

	Russ.	Slov.	Serbo-Cr.
N	*kósti*	*kostî*	*stvâri*
A	*kósti*	*kostî*	*stvâri*
G	*kostéj*	*kostí*	*stvárī*
D	*kostjám*	*kostę́m*	*stvárima*
L	*kostjáx*	*kostę́h*	*stvárima*
I	*kostjámi*	*kostmí*	*stvárima*

Table 2.2d. Plural paradigms of some Slavic *i*-stem nouns.

The only remaining evidence is the Indic material, in which the accent of the accusative plural varies between stem and desinence. In Vedic this is a free variation, occurring sometimes in the same word in a single text: e.g., acc. pl. _iṣáḥ_ 'juices' (_s_-stem) occurs in the Rigveda seven times, as against sixty-three instances of _íṣaḥ_. The facts of the later language indicate that leveling applied in the direction of accented stems (Whitney 1889:125, 146). Wackernagel and Debrunner (1896–1954:3.20, 24, 60) regard the accented desinence in ablauting stems as original, and this is also the opinion of Osthoff (1876:35–6). Bailey assumes that in such forms 'the accent was generally moved back to agree with the other nominative and accusative cases', and he concludes, 'Since the variation implies a change at some point along the line, and since the later forms do not have the accent on the ending, we infer that the older forms had accented desinence' (1970:81). This is sound reasoning if the comparative evidence is ignored. But it is a disturbing prospect to suppose that Hellenic and Balto-Slavic have without exception independently shifted the accent of the accusative plural in stems with variable accent. Despite the direction of the accentual change over the course of the history of Indic, it still seems safer to assume that the late PIE accent fell on the stem.

That the late PIE accent fell on the stem does not in itself explain why there is no full-grade vowel in the accusative plural of some athematic nouns, but it does make possible a relatively simple explanation. At the time of syncope in Proto-Indo-European the accusative plural was most likely a weak case, and in accordance with the position maintained above, that all weak case-forms accented the root-final vowel, the accusative plural of 'door' should be reconstructed as _*dhàwará-m(a)_ > _*dh_$_e$_wrém(+s)_, with pluralizing _-s_ probably added after syncope. Subsequently the accent shifted to the first syllable, reducing the stem-final vocoid to *$_e$. On structural grounds this is a natural development, since the accent shifted in order to bring the accentuation of the accusative plural into line with the accusative singular (and dual, if the dual category existed at this time, though that seems unlikely): in the accentual pattern of the nominative, vocative, and accusative of all three numbers, only the accented desinence of the accusative plural would have been anomalous. This account explains why the accusative plural has the accent of a strong case in Greek and Balto-Slavic, and even usually in Indic, while it has the vocalism of a weak case. There does not seem to be any easy way to account for the vocalism of the accusative plural stem without assuming that this was originally a weak case.

In addition to Vedic *dvā́r* there are a few monosyllabic stems ending in resonants that also show strong and weak stems in paradigmatic alternation, mainly in Indo-Iranian. Av. *zyå* 'winter' (<**ĝhyōs* < **ĝhyṓms*) shows a weak stem in gen. sg. *zimō* (<**ĝhimós*). There is no exact Indic cognate (unless Rigvedic instr. sg. *himā́* belongs here rather than with thematized *himá-* 'cold'—it is simply impossible to say), and nowhere else is the original alternation preserved: cf. Gk. χιών, χιόνος 'snow', and Lat. *hiems, -is* 'winter'. However, the middle stem is reflected in Arm. gen. *jean* 'snow' (cf. nom. *jiun* < **ĝhiyōm*) and OW *gaem* 'winter' and Gaul. *Giamon* (abbreviated name of a month). Av. acc. sg. *zyąm* provides evidence for the view advanced above that in Proto-Indo-European the accusative singular ending had both syllabic and nonsyllabic allophones in athematic declension, as determined by environment. Av. *zyąm* reflects **ĝhyōm* (and not ***ĝhyōmm̥* or ***ĝhyomm̥*), and so there ought to be assumed an earlier form in which the nonsyllabic inflection **-m* was added directly to the *m* of the stem. This reconstruction in turn accounts for the long vowel, in accordance with Szemerényi's hypothesis that PIE vowels were lengthened upon simplification of a following geminate consonant (i.e., acc. sg. **ĝhyōm* < **ĝhyomm* < **ghayáma-m[a]*). From the accusative the long vowel was extended to the other strong cases: Gk. χιών in comparison to *zyå* (<Indo-Iranian **ĝhyās*) shows that the PIE nominative form must have been **ĝh(i)yōms*. (It should be noted that under any circumstances the lengthening Szemerényi posits to account for lengthened grade cannot be invoked to account for the nominative singular here: the hypothesis is that *s* assimilates, not the preceding consonant, and then only when the consonant is dental.)

This lengthening in the accusative singular is confirmed by another PIE root-stem in *m*, Av. acc. sg. *ząm* 'earth' (=Skt. *kṣā́m*, not attested in the Vedas). These are more difficult to explain as analogical than is Gk. χθόνα. The PIE etymon of this word is difficult to reconstruct, since the consonantism is much disputed: some assume PIE **ĝhðom-* or some such (see, e.g., Pedersen 1925:41–2; Benveniste 1937a; and Pokorny 1959:1.414–6), while others, in view of Hitt. *te-(e-)kán* 'earth' and Toch. A *tkaṃ* 'earth', reconstruct PIE **dh(e)ĝhom-*, with metathesis in Greek and Indic (see, e.g., Kretschmer 1932; Sturtevant and Hahn 1951:59; Schindler 1967; Szemerényi 1980:46–7; and Georgiev 1981:36). PIE **ð* is of course highly suspect. And the semantic and phonological similarity of the Hittite and Tocharian forms to the others is so close that it is difficult to dismiss the connection, as Benveniste does. Nor is it any insuperable obstacle that, as Benveniste points out, the Hittite and Tocharian words reflect *n* where the others reflect *m* (cf. Hitt. gen. sg. *tak-na-(a-)aš*, Toch. A gen. sg. *tkanis*). The difference does need to be explained, but analogy is not improbable: there are no stems in *m* in either Hittite or Tocharian, and so the word could quite naturally have been transferred to the *n*-stems, considering that in both languages word-final PIE **n* and **m* fall together, with the result that in some case-forms this word would actually have been indistingishable from a *n*-stem. If the word began with PIE **dhĝh-*, under iterative syncope the genitive singular ought to be **dheĝhmós* (with *ₑ* restored to *e* where it could not form a syllabic consonant with a flanking segment) in paradigmatic alternation with acc. sg. **dhĝhómm*, nom. sg. **dhĝhóms*, later **dhĝhṓms* by stem-leveling in the strong cases. These alternations would be sufficiently extreme to induce paradigm regularization of the initial consonantism. It is in fact a nearly exceptionless generalization about PIE declension that ablaut alternations are restricted to desinences and stem-final syllables—the only exceptions are the *H*-stems, discussed below. Accordingly, it might be supposed that the initial syllable was generalized as either **dhe-* or **dh-*, the former accounting for the Hittite forms, and the latter for the others. But this of course is speculative: for a different interpretation see the discussion of the initial cluster below (§5.1).

One other root-stem in *m* supports the assumption that the accusative singular ending of root-stems could be nonsyllabic when it was not flanked by consonants of smaller aperture. There are a few scattered remnants of a stem **dem-/dom-*

'house', which has gone over to other stem classes in all languages except Armenian, which has nom. acc. *tun* (<**dōm*), instr. *tamb* (< **dm̥-bhi*). Outside of Armenian the root-stem is preserved only in a few relic constructions. The only reflex of the accusative singular outside of Armenian confirms the lengthening to be expected in **dōm* < **domm*: this form is the hapax legomenon YAv. *uši-dąm* 'Having Its House Near the Dawn' (name of a mountain), also attested in the nominative as *uši-då*. Several forms of the locative are attested: Av. *dąm*, *dąmi*, *ha-dəmōi*, and Gk. ἔν-δον beside the lone Vedic gen. pl. *damā́m*. GAv. loc. pl. *dāhvā* is thematized. Otherwise there is only the genitive singular preserved in an apparently very archaic construction, Gk. δεσ-πότης 'master, lord', Vedic *dám-patiḥ*, Av. gen. sg. *dəng patōiš*. These reflect a genitive **dems*, rather than one with accented desinence. But once it is recognized that the genitive is reflected nowhere except in this construction, **dems* becomes readily understandable. Apparently this formation is archaic enough to predate syncope, although not apocope, and even at that early date was sufficiently idiomatic to be treated as a compound, with a single primary accent: so Pre-IE nom. sg. **dámas-pàtayà-s* rendered **dems-*$p_{e}ty_{e}s$ > **dems-potis*. The only counterevidence to this analysis is Vedic *pátir dán*, which appears four times in the Rigveda, along with one occurrence of voc. du. *pátī dán*. But these appear only at the ends of padas with trochaic cadences, such as triṣṭubh lines, and so apparently this is a backformation from **dáns-patis*, created for metrical purposes.

Some diphthongal root-stems also show ablaut alternations, e.g. Vedic *dyāúḥ* 'heaven; day'. These, however, will be examined with the *i*- and *u*-stems, since they show some of the same peculiarities of inflection.

Doubtless, root-stems in occlusives originally showed the same ablaut alternations as Vedic *dvā́r* and such, but no such alternations are attested in any IE language. Rather, a single stem has been extended throughout the paradigm. This paradigm regularization apparently took place at the dialectal level, since not all languages show the same ablaut grade of the stem. In Indo-Iranian it is consistently the weak stem that has been generalized. For example, there are twenty roots in *d* that form Vedic root-stems, and fourteen of them have syllabic resonants in the root (*nid-* 'revile', *mud-* 'rejoice', etc., listed by MacDonell 1910:196–7), while the other six reflect PIE _*e/o_ in the root, from *$_e$ where it could not combine with a flanking segment to form an interconsonantal syllabic consonant, e.g. in _sad-_ ‘sit’, _pad-_ ‘go’, _mad-_ ‘be exhilarated’, etc. The complementary distribution of full and weak grades in groups of stems like these, according to whether or not the root contains a vocalizable interconsonantal resonant, is strong evidence for the claim that *$_e$ was restored to full grade wherever it could not combine with a flanking resonant to form a syllabic consonant. It may be supposed that in the weak cases of forms such as these a vocoid was restored in the root because at least under some sandhi conditions it was phonetically problematic to create biconsonantal word-initial consonant clusters in which the aperture of the second consonant was equal to or smaller than that of the first. So at the beginning of an utterance and in sandhi after consonantal finals _*pdós_ became _*p$_e$dós_. In sandhi after vocalic finals there was no obstacle to a zero-grade root, and this explains why no root vowel is found in compounds such as Skt. _upa-bdá-_ ‘din’ (orig. *“trampling’), Av. _fra-bda_ ‘forefoot’, and Gk. ἐπί-βδα ‘day after the feast’, where the root was always postvocalic. Another factor perhaps to be reckoned with in this regard is a tendency to avoid reducing the entire stem to null vocalism. Kuryłowicz (1964:105–6) invokes this principle to account for the insertion of _-n-_ into certain heteroclitic stems in Proto-Indo-European, e.g. Vedic gen. sg. _ahnáḥ_ ‘day’ (but cf. below, §3.2). Further evidence for this analysis is presented below, in regard to the Avestan word for ‘father’ (§§3.3.1, 3.3.4).

That the analogical extension of the weak stem throughout the paradigm is an exclusively Indo-Iranian development is demonstrable from Greek and Latin, the two European languages that best preserve these root-stems. Full-grade examples are Gk. φλέψ, φλεβός ‘vein’, *κρόξ, acc. κρόκα ‘weft’, πρόξ, προκός ‘gazelle’, φλόξ, φλογός ‘flame’, Lat. _prex_, _precis_ ‘request’, _spēs_, _spēī_ ‘hope’ (<_*speH-_), etc. Reduced-grade examples are Gk. θρίξ, τριχός ‘hair’, δράξ, δρακός ‘handful’, Lat. _nux_, _nucis_ ‘nut’, _pix_, _picis_ ‘pitch’, and _cor_, _cordis_ ‘heart’ (like Lith. _širdîs_, Latv. _sir̂ds_, OCS _srъdъce_, Hitt. _kar-ta-aš_, but full or lengthened grade in Gk. κῆρ, Goth. _hairto_, Arm. _sirt_). The factor governing whether the leveled stem is strong or weak appears to be the principle of avoidance of stem-final consonant clusters. In Latin and Greek, almost without exception, full-grade roots of this class end in a vowel followed by a single consonant, e.g. Gk. φλεβ-, κροκ-, Lat. *hiem-* 'winter', *ped-* 'foot', etc. Almost without exception, the structure *CeRC-* does not occur, and everywhere it might be expected on the basis of related forms, the weak-grade *CR̥C-* appears instead, e.g. Gk. στιχ- 'row' (cf. στοῖχος 'row'), νιφ- 'snow' (cf. Goth. *snaiws*, Eng. *snow*); Lat. *duc-* 'leader' (cf. *dūcō*, OLat. *doucō* 'lead'), *dic-* (in *dicis causā*, *dicis grātiā*, 'for form's sake, for the sake of appearances' : *dīcō* 'say', Gk. δείκνῡμι 'show'). For a complete collocation of the Greek material see Schwyzer (1939–50:1.423–4); and for the Latin see Leumann and Hofmann (1928:199–200). Presumably, stem-final consonant clusters suffered loss of consonants in some cases of the strong stem (as they do, for instance, in the nominative singular of Latin and Greek present participles), and so the weak stems replaced the resulting strong stems that had anomalous consonantism. Greek roots of the type *CeHC-* do not conform to the pattern, e.g. φώψ, θώς, πτώξ, ῥώξ, etc., suggesting that this paradigm regularization did not take place until after the loss of laryngeals.

Root-stems of the form *(C)CeC-* conform well to the pattern of iterative syncope, but roots of the form *CeCC-* ought to show preservation of a stem-final *$_e$, e.g. nom. sg. *CáCaCà-s* > *CéCC*$_e$*s* > *CeCCes*. However, doubtless in the nominative the *$_e$ would have been eliminated by the analogical redifferentiation of the singular and plural. In the accusative singular there is some reason to think that *-*C-*$_e$*m* before vocalic initials in external sandhi would have given *-*C-em* (see the discussion of the vocative singular of *i-* and *u*-stems, §2.3), but elsewhere it would have been identical with the reflex of *-*C-m* before consonants, and so very likely *-*em* was lost when alternations in the form of the ending were eliminated.

Root-stems in *ī* and *ū* are quite regular. Since they have the structure *(C)CR̥H-*, it is the weak stem, as expected, that is consistently generalized. So for instance the stem of gen. *bhruHós* < *bhr$_e$wHós* 'brow' (Skt. *bhrúvaḥ*, Gk. ὀφρύος) has been extended into the nominative, giving *bhruHs* (Skt. *bhrū́ḥ*, Gk. ὀφρῦς), which probably replaces *bhr̥wéHs*. This earlier nominative appears to be reflected in Lith. *birwe* (beside *bruvìs*), as suggested by Trautmann (1911), though he assumes the syllabicity of the *r̥* is a Balto-Slavic innovation.

In addition to the root-stems in *ī* and *ū* there is at least one other stem ending in a laryngeal, and it is of particular interest because it preserves ablaut alternations of the stem in Indo-Iranian. This is the word for 'path', which is also the most celebrated evidence for the aspiration of stops by laryngeals in Indo-Iranian, a process first described by de Saussure.[8] The Avestan paradigm is represented in Table 2.2e, along with a Proto-Indo-European reconstruction. This appears to be the only known instance in which an actual alternation of aspiration produced by the laryngeal is preserved: In the weakest cases, where the *t* and the laryngeal were contiguous, there is aspiration, while in the strong cases, where the two consonants were not contiguous, the stop remains unaspirated. This alternation of aspiration is not preserved in the Indic cognate, though the ablaut alternation of the stem is, e.g. nom. sg. *pánthāḥ*, gen. *patháḥ*, instr. pl. *pathíbhiḥ*.

This solution is today almost universally accepted—for an extensive but not exhaustive list of its proponents see

sg.	nom.	*pantā̊*	<	**ponteHs*
	acc.	*pantąm*	<	**ponteHm*
	instr.	*paθa*	<	**pṇtHeH*
	gen.	*paθō*	<	**pṇtHos*
	loc.	*paiθī*	<	**pṇtHi*
pl.	acc.	*paθō*	<	**pṇtHṇs*
	instr.	*padəbīš*	<	**pṇtḤbhis*
	gen.	*paθąm*	<	**pṇtHoHm*

Table 2.2e. Paradigm of the Avestan word for 'path', along with a Proto-Indo-European reconstruction.

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[8] De Saussure's idea is reported in *BSL* 7 (1892), cxviii (reprinted in de Saussure 1922:603).

Szemerényi (1975:334 n.17). Yet Szemerényi (supported by Bammesberger 1984:137–9) offers cogent objections to this analysis: it is difficult to understand why the nominative stem **pontē-* is attested only in Indo-Iranian (cf. OCS *pǫtь* < **pontis*, OPruss. *pintis* < **pn̥tis*, etc.); and the reconstruction of a strong stem with two full-grade vowels is in itself suspect. Accordingly he reconstructs a stem in *-nt-* without laryngeal, and argues that the vocalism of Proto-Indo-Iranian nom. sg. **pā* (<PIE **pōn* < **ponts*) was extended to the accusative (PIE **pont[h]-m̥*), giving **pant(h)ā-m*; and the reformed accusative stem was then leveled into the nominative. Szemerényi's objections are well taken. On the other hand, the laryngeal explanation offers so many advantages that they are difficult to relinquish. The laryngeal first of all accounts for the stem-final long vowel of the strong stem, as recognized quite early by Holger Pedersen (1893:269). It also accounts for the stem-final fricative of the Avestan weakest stem, reflecting a Proto-Indo-Iranian voiceless aspirate. Moreover, it accounts for the stem-final *i* of the Vedic middle stem. But most important of all, it accounts for the complementary distribution of these three alternating features of the stem, given the assumption that the Avestan paradigm reflects the original Indo-Iranian consonant alternations. It is necessary only to assume then that in Indic the voiceless aspirate of the weakest cases has been leveled into the entire paradigm. And after all, such paradigm regularization is entirely characteristic of Indic, as there is similar elimination of many paradigmatic alternations produced by Bartholomae's and Grassmann's laws. Given the conservatism of Indo-Iranian declension in comparison to declension in other IE languages, it would be surprising if Indo-Iranian had innovated so extensively here, at least in the ways Szemerényi suggests—and the assumption of analogical leveling in the paradigm is especially dubitable, considering the resulting paradigm is more irregular than ever. If in fact the original paradigm was simply that of a regular stem in *-nt-*, it is surprising that no IE language preserves this stem classification—and it is especially peculiar that Greek has thematized the word to πάτος 'path' (strong stem also thematized in πόντος 'sea' < *'sea-path').

In the Rigveda there are two forms, acc. sg. *mánthām* and gen. pl. *mathīnā́m* 'whirling-stick for making fire', parallel to *pánthām* and *pathīnā́m* (analogical, beside *pathā́m*). In the later language *pánth-* is declined in the strong cases as a *n*-stem, and the grammarians give *mánthan-/mathí-/math-* the same inflection as *pánthan-/pathí-/path-*, though attested cases are few. Since *mánth-* is definitely from a seṭ root (cf. *mathnā́ti* 'twirls', part. *mathitáḥ*), there is good reason to believe there is a stem-final laryngeal in *pánth-*.

In answer to Szemerényi's objection that the nominative stem is attested only in Indo-Iranian it can be said that it should not be surprising if it has been replaced analogically everywhere else. After all, if the Indo-Iranian paradigm reflects the original stem alternations, then surely the contrast between strong **ponteH-* and weak **pn̥tH-* must have seemed quite anomalous, especially after the loss of laryngeals, being unparalleled in any other class. It seems almost inevitable that after the loss of laryngeals the strong stem should eventually have been analyzed as **pont-* rather than **pontē-*, bringing the stem Auslaut into line with that of the weak stem. Necessarily, then, the long vowel of the original strong stem would have been analyzed as desinential (evidence below), and since the endings nom. sg. **-ēs*, acc. **-ēm*, gen. **-os*, etc., represented a highly anomalous set of inflections, they were systematically replaced in every branch other than Indo-Iranian—by thematic endings in Greek, *i*-stem endings (perhaps replacing earlier athematic endings) in Balto-Slavic, and by *i-*/consonant-stem endings in Latin *pons, pontis*. That the anomalous strong case-endings would have induced analogical transfer of desinences is in fact corroborated by the evidence of Classical Sanskrit and Younger Avestan, where in the strong cases and the strong cases only there are forms of this word that have acquired new endings, e.g. acc. sg. YAv. *pantānəm*, Skt. *pánthānam*, and nom. pl. YAv. *pantānō*, Skt. *pánthānaḥ*.

Szemerényi's other objection is the more telling one: how is it to be explained that the strong stem contains two full-grade vowels? Of course many other declensional stems contain two full-grade vowels in the strong cases, e.g. nearly all the stems in **-men-* and many of those in **-ter-*; but **-men-* and **-ter-* are stem-forming suffixes, while unquestionably **ponteH-*

is a root-stem. The _*H_ is not suffixal—at least not in the sense that it forms a stem-class of its own. Rather, given the patterns of PIE root structure, _*H_ must be an enlargement to the root. Perhaps the likeliest explanation for the dual full-grade vocalism of the strong stem is that it arose in the nominative plural: when immediately after syncope _*-es_ was analogically added to _*pont_$_e$_H-_, the sequence _*-_$_e$_H-_ was no longer interconsonantal, and so _*_$_e$ was naturally restored to full grade. That such restoration did actually take place in the nominative plural is demonstrated well by the PIE pronouns _*is_ and _*k_^{w}_is_, which were originally enclitic. In the strong cases of both numbers and all three genders, as reconstructed by Szemerényi (1980:191–2), the stems of these pronouns are _*i-_ and _*k_^{w}_i-_, except in the nominative plural masculine forms, which are reconstructed as _*eyes_ and _*k_^{w}_eyes_. These forms are understandable if, for instance, nom. sg. _*is_ and _*k_^{w}_is_ derive from _*H_$_e$_y-s_ and _*k_^w_e_y-s_. Then these same stems restored _*_$_e$ to full grade in the nominative plural when the ending _*-es_ was added, _*-_$_e$_y-_ then no longer being interconsonantal. So it may be assumed that the same restoration occurred in the nominative plural of _*ponteH-_, and this new strong stem was analogically extended to the other strong cases, just as a single strong stem was generalized in the etyma of Av. _zå_, _zyå_, etc. (above), though there the origin of the new stem was in the accusative singular. That the strong stem was consistently _*ponteH-_ throughout is confirmed by Rigvedic scansion. It was pointed out above (§2.1) that Rigvedic dissyllabic scansions of long vowels seem always to be due to the loss of a laryngeal. Just so the reconstruction acc. sg. _*ponteHm_ (with _*m_ later vocalized) is confirmed by trisyllabic scansion of _pánthām_ three times in the Rigveda. Likewise it should be expected that the nominative plural (_pánthāḥ_ < _*ponteHes_ < _*pont_$_e$_H+es_) would be scanned as trisyllabic, and there is in fact one such instance in the Rigveda. On the other hand, the nominative singular ought never to be trisyllabic, and indeed it never is.

Iterative syncope demands reconstructions of weak cases such as gen. sg. _*pn_$_e$_tHós_, instr. sg. _*pn_$_e$_tHéH_, acc. pl. _*pn_$_{\acute{e}}$_tH_$_e$_ns_, and gen. pl. _*pn_$_e$_tHóHm_, and these are accurately reflected in the attested forms. On the other hand, the locative singular is anomalous, inasmuch as it reflects no full-grade PIE vowel. According to the analysis of the locative singular offered below (§2.4), PIE *_p$_{e}$ntéHy_ should be expected, though in fact this cannot be reflected by GAv. _paiθī_. However, *_p$_{e}$ntéIIy_ would have been anomalous in its paradigm, having a stem unlike either the strong or the weak stem—one supposes it would have yielded Av. *_patāi_ (cf. Av. _ī_-stem datives in _-yāi_ < *_-y-eH-y_, §2.4, 3.4), still more anomalous in its paradigm. And so it is probably safest to assume that the normal weak stem *_pn$_{e}$tH-_ was leveled into this case, and the commonest locative ending added. After all, despite the conservatism of Avestan in regard to this paradigm, even here some clearly analogical forms are to be found: e.g., beside normal acc. sg. _pantąm_ (attested four times) an analogical YAv. _paθąm_ (attested once) has been formed from the weak stem—also, incidentally, corroborating the contention above that Indo-Iranian _-ā-_ in the strong cases came to be reanalyzed as belonging to the ending rather than the stem, since otherwise the result would be *_paθəm_. It should be pointed out, as well, that this reanalysis explains why these two root-stems in *_-H-_ are the only ones that preserve ablaut alternations before the stem-final syllable: after IIr. _-ā-_ was reanalyzed as belonging to the ending, the first ablauting syllable _was_ the stem-final syllable.

2.3. THE _I_-STEMS AND _U_-STEMS. The paradigms of _i_- and _u_-stem nouns and adjectives display alternations that are unparalleled in any other stem type. These stems fall into two distinct types, which are frequently distinguished as the 'close' and 'open' inflections. Examples of the close inflection of _i_-stems are represented in Table 2.3a by the paradigms of Skt. _matí-_ 'thought, judgment', Gk. πόλις 'city' (<*_pl̥His_; see Schwyzer 1939–50:1.344; and Pokorny 1959:1.799), Latin _axis_ 'axle', and Gothic _haurds_ 'door'. On Homeric πόλῃ as a locative see Schwyzer (p. 572). Gen. sg. πόλεως reflects πόληος (attested in Homer), by metathesis of quantities (see Lejeune 1972:256), and this explains the peculiar accent. The η apparently is extended from the locative. Attic nom. pl. πόλεις reflects *πόλεες < *_-eyes_. There is a variety of acc. pl. _i_-stem endings in Greek, of which -ινς appears to be the most archaic: cf. Ionic πόλῑς < -ινς. Likewise ι in Ionic and Homeric gen. pl. πολίων is certainly older than ϵ in Attic

		Skt.	Gk.	Lat.	Goth.
sg.	nom.	*matíḥ*	πόλις	*axis*	*haurds*
	voc.	*mate*	πόλι	—	*haurd*
	acc.	*matím*	πόλιν	*axem*	*haurd*
	gen.	*matéḥ*	πόλεως	*axis*	*haurdais*
	dat.	*matáye*	πόλει	*axī*	—
	loc.	*matā́(u)*	πόλῃ	—	*haurdai*
pl.	nom.	*matáyaḥ*	πόλεις	*axēs*	*haurdeis*
	acc.	*matī́ḥ*	πόλεις	*axīs*	*haurdins*
	gen.	*matīnā́m*	πόλεων	*axium*	*haurde*

Table 2.3a. Paradigms of some Indo-European close-inflected *i*-stem nouns.

πόλεων (the peculiar accent is explained below). And so Szemerényi (1980:161) is surely right to offer the forms of τρεῖς 'three' as reflecting the most archaic state of affairs in the plural: cf. Cretan nom. τρέες, acc. τρίνς, gen. τρίων.

The close-inflected *u*-stems correspond precisely to the *i*-stems. Examples are Skt. *śátru-* 'enemy', Gk. πῆχυς 'forearm', Lat. *lacus* 'lake', and Gothic *handus* 'hand' (Table 2.3b). In the table, the forms of πῆχυς are Attic. The expected acc. pl. ending -υνς is reflected in Cretan υιυνς 'sons'.

In general, the Sanskrit paradigms seem to reflect PIE conditions accurately, with these few exceptions: the Greek and Gothic evidence suggests that the ending in the locative singular of *i*-stems was *-*ēy*, the form that would in fact complete the expected congruence with the *u*-stems. In the accusative and genitive plural there is lengthening of the final resonant in Sanskrit, which is the norm in vocalic stems—an Indo-Iranian analogical development, discussed below (§§3.3.4, 3.4). The nasal in the genitive plural ending is also an analogical development common to all Sanskrit vocalic stems, and it is often thought to have been transferred from the *n*-stems (but cf. below, §3.4). Taking into account these few

		Skt.	Gk.	Lat.	Goth.
sg.	nom.	*śátruḥ*	πῆχυς	*lacus*	*handus*
	voc.	*śátro*	πῆχυ	—	*handu, -au*
	acc.	*śátrum*	πῆχυν	*lacum*	*handu*
	gen.	*śátroḥ*	πήχεος	*lacūs*	*handaus*
	dat.	*śátrave*	πήχει	*lacuī*	—
	loc.	*śátrāu*	—	—	*handau*
pl.	nom.	*śátravaḥ*	πήχεις	*lacūs*	*handjus*
	acc.	*śátrūn*	πήχεας	*lacūs*	*handuns*
	gen.	*śátrūṇām*	πήχεων	*lacuum*	*handiwe*

Table 2.3b. Paradigms of some Indo-European close-inflected *u*-stem nouns.

innovations in Indic, one arrives at the reconstructed PIE endings of the close inflection of *i*- and *u*-stems offered by Szemerényi (1980:162), as presented in Table 2.3c.

In the Rigveda a small number of *i*- and *u*-stems, ten or eleven, follows a different type of inflection, the open type. Representative are the paradigms of *arí*- 'stranger' and *krátu*- 'power, wisdom' in Table 2.3d, with unattested forms of these

	singular		plural	
nom.	**-is*	**-us*	**-eyes*	**-owes/-ewes*
voc.	**-ei*	**-ou*	**-eyes*	**-owes/-ewes*
acc.	**-im*	**-um*	**-ins*	**-uns*
gen.	**-eis/-ois*	**-ous/-eus*	**-iyom*	**-uwom*
dat.	**-eyei*	**-owei/-ewei*	**-i-bh-*	**-u-bh-*
loc.	**-ēi*	**-ōu/-ēu*	**-isu*	**-usu*

Table 2.3c. The Proto-Indo-European endings of close-inflected *i*- and *u*-stem nouns and adjectives (according to Szemerényi 1980:162).

supplied on the basis of attested forms of *páti-* 'husband', *ávi-* 'sheep', *mádhu-* 'sweet', *paśú-* 'head of livestock', and *vásu-* 'good'. The PIE origin of this type of inflection is assured by the existence of a few similar forms in cognate languages. So, for instance, Av. gen. sg. *xraθwō* and *pasvō* correspond to *krátvaḥ* and *paśváḥ*. Cognate with *ávi-* is Homeric ὄϊς, acc. ὄϊν, gen. οἰός (beside analogical ὄϊος), acc. pl. ὄϊς (<ὄϝινς, attested in Argolic), gen. pl. οἰῶν, from **owis*, **owin*, **owyos*, **owins*, **owyōm*. Otherwise, evidence of open-inflected *i*-stems has been lost in Greek, because postconsonantal **y* was eliminated, undergoing various developments at an early date (e.g. πεζός < *πεδι̯ός; κλέπτω < *κλέπι̯ω; γλῶσσα < *γλῶχι̯α, etc.), and so the alternation between *i* and *y* in the open-inflected *i*-stems would have resulted in extreme paradigmatic alternations in consonantism. Likewise, postconsonantal ϝ was generally lost in Greek, but evidence for open-inflected *u*-stems is preserved where ϝ has undergone metathesis with a preceding resonant, e.g. in Hom. gen. sg. γουνός 'knee' < *γονϝός, cf. nom. γόνυ.

In regard to the accusative plural, ὄϊς suggests the ending **-ins*, while the Sanskrit evidence points to **-yn̥s*, **-wn̥s*. The Avestan evidence is ambiguous, since to Vedic *paśváḥ* correspond both YAv. *pasūš* and *pasvō*; but the latter is

sg. nom.	*aríḥ*	*krátuḥ*
voc.	**are* (cf. *pate*)	*krato* (cf. *madho*)
acc.	*arím*	*krátum*
gen.	*aryáḥ*	*krátvaḥ*
dat.	**aryé* (cf. *pátye*)	*krátve*
loc.	**aryā́u* (cf. *pátyāu*)	*krátāu*
instr.	**aryā́* (cf. *pátyā*)	*krátvā*
pl. nom.	*aryáḥ*	**krátvaḥ* (cf. *mádhvaḥ*)
voc.	unattested	unattested
acc.	*aryáḥ*	**krátvaḥ* (cf. *paśváḥ*)
gen.	**arīṇā́m* (cf. *ávīnām*)	**krátūnām* (cf. *vásūnām*)

Table 2.3d. Representative paradigms of Rigvedic open-inflected *i*- and *u*-stem nouns.

more likely to be the original form, since the former can be explained as analogical to the close-inflected type, while the ending of the latter does not appear with stems of the close-inflected type. It should be noted that the Vedic endings are rather anomalous, since in all other classes a stem-final resonant is vocalic and long in the accusative plural, and so the Vedic endings are unlikely to be analogical. That, in addition to the fact that the open inflection of *i*-stems is best preserved in Vedic, prompts the conclusion that the endings **-yn̥s* and **-wn̥s* are correct. Forms like Hom. acc. pl. πόλιας are certainly analogical, though it is not possible to say whether they are analogical to consonant-stems or original PIE open-inflected *i*-stems. The Indo-Iranian genitive plural endings are once again certainly not original, and the etymological endings can only be guessed at. The pattern of the rest of the paradigm is that the stem-final resonant is non-syllabic and is not preceded by a vowel, though in the weak cases it is followed by a vowel, and so the likeliest endings in the genitive plural are **-yoHm* and **-woHm*. Thus for the open-inflected *i*- and *u*-stems may be reconstructed the endings in Table 2.3e. On the locative, see below (§2.4).

	singular		plural	
nom.	**-is*	**-us*	**-yes*	**-wes*
acc.	**-im*	**-um*	**-yn̥s*	**-wn̥s*
gen.	**-yes/-yos*	**-wes/-wos*	**-yoHm*	**-woHm*
dat.	**-yey*	**-wey*		
instr.	**-yeH/-yoH*	**-weH/-woH*		

Table 2.3e. Proto-Indo-European endings of the open-inflected *i*- and *u*-stem nouns and adjectives.

To explain the origin of the differences between the close and open inflections of this class, Szemerényi (1980:163–5) begins with the assumption that **i* and **u* were fully autonomous vowel phonemes in Proto-Indo-European, of the same structural value as **e/o*, rather than consistent derivatives of **y* and **w*, as is usually assumed. Then, starting from the observation that the endings of the close inflection appear with originally heavy stems, and the endings of the open inflection with light stems, he adduces the reconstructions for Skt. *páti-*, *krátu-*, *matí-*, and *bāhú-* ‘arm’ represented in Table 2.3f. He explains:

> Aus I gingen natürlich mit dem einfachen Wandel von *-i-os* zu *-yos* usw. die Nebentypen der frühen historischen Zeit hervor. Die frühidg. Silbenbildung erlaubte aber keinen entsprechenden Wandel bei II: **men-ti-os* konnte nicht zu **mentyos* werden, sondern nur zu **mentiyos*, und **bhāgh-u-os* nur zu **bhāghuwos*. Wenn diesen Formen in den historischen Zeiten **mṇteis* und **bhāghous* entsprechen, dann müssen wir folgern, dass **mentíyos* zu **mentéyos* und nach dem Inkrafttreten der Schwundstufengesetze zu **m(e)ntéy(o)s*, d. h. **mṇtéis*, und **bhāghuwos* entsprechend zu **bhāghow(o)s*, d. h. **bhāghous*, wurde.

This explanation has a degree of plausibility because it takes into account the apparent conditioning factor, the weight of the stem syllable—i.e., the number of consonants, including laryngeals, preceding the stem-final resonant. On the other hand, this account is not without difficulties. The assumption that **i* and **u* were originally autonomous phonemes rather than historical derivatives of **y* and **w* is an unusual view (but cf. Hewson 1984), and the further claim that these could

		I		II	
sg.	nom.	**pot-i-s*	**kret-u-s*	**men-ti-s*	**bhāgh-u-s*
	acc.	**pot-i-m*	**kret-u-m*	**men-ti-m*	**bhāgh-u-m*
	gen.	**pot-i-os*	**kret-u-os*	**men-ti-os*	**bhāgh-u-os*
	dat.	**pot-i-ei*	**kret-u-ei*	**men-ti-ei*	**bhāgh-u-ei*
pl.	nom.	**pot-i-es*	**kret-u-es*	**men-ti-es*	**bhāgh-u-es*
	acc.	**pot-i-ns*	**kret-u-ns*	**men-ti-ns*	**bhāgh-u-ns*
	gen.	**pot-i-om*	**kret-u-om*	**men-ti-om*	**bhāgh-u-om*

Table 2.3f. Reconstructions of Proto-Indo-European *i*- and *u*-stem nouns, both light (I) and heavy (II), according to Szemerényi (1980:164).

develop to **e* and **o* in this inflectional class is dubitable, since the development is unparalleled in PIE phonology. More important, though, is the problem of accent: if the heavy stems are assumed to have carried the accent on the stem-final semivowel (**mentíyos*), consistency dictates that the light stems should have had the same accentuation (**pot-í-os*).[9] Without this assumption there is no point to Szemerényi's explanation, since the difference in stem weight does not account for anything if the divergent inflections are actually to be attributed to a difference in the position of the accent. There is at any rate no apparent reason the heavy stems should have been accented consistently on the semivowel and the light stems consistently elsewhere. If the semivowel then carried the accent in both types, it is not easy to see how the syllabicity of the semivowel in the light stems could have been lost. A possible solution to the problem is to assume that the accent shifted, wherever it could, to the semivowel *after* the loss of syllabicity in the light stems; but once that assumption is made, a superior analysis is possible, within the framework of iterative syncope. If *ávi-* and *matí-* are derived from Pre-IE **Hawa-ya-* and **mana-ta-ya-*, respectively, and if the accent originally fell on the first syllable throughout the paradigm, the syncope rule will regularly produce the attested light and heavy stems. After the application of apocope and the primary and secondary stress rules (the stage represented under I in Table 2.3g), syncope applied as usual, deleting all unstressed vowels (stage II in the table). After the application of the syncope rule came the

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[9] A word perhaps needs to be said in defense of Szemerényi's reconstruction **pot-i-os*, since the point was raised, in the discussion following the presentation of some data from §2.3 at the annual meeting of the Linguistic Society of America (Baltimore, Dec. 29, 1984), that Vedic Sanskrit has *pátyuḥ* (i.e. *pátyur*), not **pátyaḥ*. But this Vedic form is irrelevant, since Wackernagel (1879:289) is surely right that *pátyuḥ* is analogical to the genitive of *r*-stem kinship terms: the semantic connection is right, and is corroborated by the genitives *sákhyuḥ* 'friend's' (open-inflected *i*-stem) and *jányuḥ* 'wife's' (*ī*-stem), as opposed to the normal and semantically different open-inflected *i*-stems *aryáḥ* 'stranger's' (nearly forty times in the Rigveda) and *ávyaḥ* (nearly 20 times).

		I		II		III		IV
sg.	nom.	_*Háwayà-s_	>	_*Háwyàs_			>	_*Héwy$_e$s_
	voc.	_*Háway_	>	_*Háwy_			>	_*Héwy_
	acc.	_*Háwayà-m_	>	_*Háwyàm_			>	_*Héwy$_e$m_
	gen.	_*Háwayà-s_	>	_*Háwyàs_	>	_*Hàwyás_	>	_*H$_e$wyós_
	dat.	_*Háwayà-y_	>	_*Háwyày_	>	_*Hàwyáy_	>	_*H$_e$wyéy_
	loc.	_*Háwayà-y_	>	_*Háwyày_	>	_*Hàwyáy_	>	_*H$_e$wyéy_
	instr.	_*Háwayà-H_	>	_*HáwyàH_	>	_*HàwyáH_	>	_*H$_e$wyéH_
pl.	nom.	_*Háwayà-s_	>	_*Háwyàs_			>	_*Héwy$_e$s_
	acc.	_*Háwayà-m_	>	_*Háwyàm_	>	_*Hàwyám_	>	_*H$_e$wyóm(+s)_
	gen.	_*Háwayà-Ham_	>	_*HáwyàHm_	>	_*HàwyáHm_	>	_*H$_e$wyóHm_
sg.	nom.	_*mánatàya-s_	>	_*mántàys_			>	_*mént$_e$ys_
	voc.	_*mánatày_	>	_*mántày_			>	_*mént$_e$y_
	acc.	_*mánatàya-m_	>	_*mántàym_			>	_*mént$_e$ym_
	gen.	_*mánatàya-s_	>	_*mántàys_	>	_*màntáys_	>	_*m$_e$ntóys_
	dat.	_*mánatàya-y_	>	_*mántàyy_	>	_*màntáyy_	>	_*m$_e$ntéyy_
	loc.	_*mánatàya-y_	>	_*mántàyy_	>	_*màntáyy_	>	_*m$_e$ntéyy_
	instr.	_*mánatàya-H_	>	_*mántàyH_	>	_*màntáyH_	>	_*m$_e$ntéyH_
pl.	nom.	_*mánatàya-s_	>	_*mántàys_			>	_*mént$_e$ys_
	acc.	_*mánatàya-m_	>	_*mántàym_	>	_*màntáym_	>	_*m$_e$ntéym(+s)_
	gen.	_*mánatàya-Hàm_	>	_*mántàyHàm_	>	_*màntàHám_	>	_*m$_e$nt$_e$yHóm_

Table 2.3g. The effects of syncope and accent shift on the etyma of Vedic *ávi-* 'sheep' and *matí-* 'thought, judgment'.

accent shift, which was simple and regular: in the weak cases the primary accent regularly shifted to the final syllable of the word, while it remained on the first syllable in the strong cases (stage III). The motivation for the accent shift was to bring these paradigms into line with those of other consonant stems, which showed the usual alternation in the position of the primary accent between stem and suffix. Finally, secondary stress was lost, and all unstressed vowels were reduced to *$_e$ (stage IV). The chronology of these changes is important, since, for instance, the accent shift does not produce the same results as the one that affected the accusative plural. It was hypothesized above (§2.2) that when the accent shifted from the desinence to the stem in the accusative plural, the newly-accented stem vowel remained in reduced grade, thus explaining why many athematic stems have no full-grade vowel in either the stem or the suffix in the accusative plural, as in Vedic _dúraḥ_ < *_dhurn̥s_. This shift took place after the stem-vowel had been reduced to *$_e$, i.e. after stage IV in the table. The accent shift in the _i_- and _u_-stems, on the other hand, took place before the reduction of vowels with secondary stress to *$_e$.

Some of the case-forms in Table 2.3g merit particular comment. Just as with the root-stems, the nominative singular and plural were identical after syncope, and so the analogical ending *_-es_ was added in the plural to the stems *_Hewy-_ and *_ment$_e$y-_. In the latter form the reduced vowel then appeared in an environment in which it could not bond with a resonant to produce a syllabic consonant, and so it was restored to full grade: the ending *_-eyes_, then, the form that the comparative evidence points to, is also the form predicted under syncope.

Szemerényi's analysis (1980:110) of the locative singular is undoubtedly correct for the close-inflected stems: the word-final geminate was simplified, with compensatory lengthening of the preceding vowel (*_-eyy_ > *_-ēy_), just as the simplification of word-final geminates gave rise to lengthened grade in the nominative singular of some athematic stems (§2.2). It is a prediction of the analysis under iterative syncope that in these classes the dative and locative forms fell together after syncope. Since these cases require a fairly lengthy excursus, discussion of the dative and locative will be reserved for separate analysis (§2.4).

As usual, the accent in the accusative plural shifted after stage IV was achieved, and so *_H$_e$wyóm(+s)_ becomes *_H$_{\acute{e}}$wy$_e$m(+s)_, and *_m$_e$ntóym(+s)_ gives *_m$_{\acute{e}}$nt$_e$ym(+s)_. Like all accusatives plural with a stem-final syllabic segment, the latter form shows lengthening of that segment in Indo-Iranian, as discussed below (§3.3.4).

The reduced vowel in the root reverted to full grade in a weak stem like *_p$_e$ty-_ > Vedic _páti-_, and so the same development should have taken place in several other open-inflected *i-* and *u*-stems: cf. *paśú-*, *sákhi-* 'friend', *mádhu-*, and *vásu-*. On the other hand, where this restoration of full grade in the weak stem should not be expected to have occurred, the root vocalism of either the strong or the weak stem was extended throughout the paradigm: so *pitú-* 'juice, nourishment', *śíśu-* 'infant; young (of animals)', and **kŕ̥tu-* 'making' (only in the accusative plural *kŕ̥tvaḥ* 'times [indicating frequency]'), show weak vocalism of the root, while *arí-*, *ávi-*, and *krátu-* show strong.[10] Likewise, though the root structure of close-inflected *i-* and *u*-stems demands the assumption that strong and weak grades originally alternated in the root, among direct cognates there is in general a single ablaut grade reflected, e.g. Vedic *así-* 'sword' = Lat. *ēnsis* 'sword' (<**Hn̥si-*); and Vedic *matí-* = Lat. *mēns* 'mind', Gothic *ga-munds* 'remembrance', Lith. *mintìs* 'thought', OCS *pa-mętь* 'remembrance' (<**mn̥ti-*). Such regularity suggests that a single alternant was generalized already in Proto-Indo-European.

The vocative singular of *i-* and *u*-stems presents some striking difficulties. In other athematic classes the vocative is identical to the bare strong stem without lengthened grade, and so except for the *i-* and *u*-stems it would be possible to say that the vocative singular of athematic nouns could always be formed directly from the original strong stem. But the usual reconstructions of the vocative singular endings for *i-* and *u*-stems are **-ey* and **-ow* (or **-ew*), respectively (as Szemerényi reconstructs them—see Table 2.3c above). The problem is a particularly thorny one: see Winter (1969). In actuality, however, it is an oversimplification to say that *i-* and *u*-stems ended in **-ey* and **-ew* in Proto-Indo-European, because outside of Sanskrit there is contradictory evidence. In fact, it cannot be doubted that originally the vocative showed the alternants **-ey/*-i* and **-ew/*-u*, because in Avestan and Gothic there are both full- and reduced-grade forms (e.g. Av. *aži* beside *aže*, to *ažay-* 'serpent', and Gothic *sunu* beside *sunau*, to *sunus* 'son'), while Greek shows only the reduced grade (e.g. ὄφι to ὄφις 'serpent', and πῆχυ to πῆχυς 'forearm'). On the other hand, as with Sanskrit, Baltic and Slavic have generalized the full-grade alternants, e.g. Lith. *naktẽ* (to *naktìs*) = OCS *noštь* (to *noštь* 'night'), and Lith. *sūnaũ* (to *sūnùs*) = OCS *synu* (to *synu* 'son').

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[10] The connection of *pitúḥ* with Lith. *piẽtūs* 'midday meal' (<**peitu-*), and with thematic Av. *pōi*θwa 'fat', Skt. *pétva-* 'ram, wether', is at best dubitable; and Pokorny's (1959:1.531) collocation of cognates to Gothic *hardus* 'hard' and Hom. κρατύς 'strong' justifies his opinion that *krátuḥ* is only distantly related to these. The stem *śíśu-* appears not to have any morphologically parallel cognate.

The PIE distribution of these two forms of the vocative is now irrecoverable, but surely it is unlikely that the distribution was as simple as, say, **-ey* in the close-inflected stems and **-y* in the open-inflected. If the distribution had been such, it would be peculiar that Vedic does not preserve it, since otherwise Vedic maintains quite well the distinction between open- and close-inflected types. In that event perhaps the original distribution was governed by external sandhi conditions. It was pointed out in the preceding chapter (§1.9) that while R_e- does not become a syllabic consonant at the beginning of a word unless the resonant is **y* or **w* (and then probably not in all morphological classes), word-final -${}_eR$ apparently does; but at the same time it was suggested this situation is the result of the generalization of sandhi variants. Perhaps then the vocative endings **-ey* and **-ew* represent earlier *-${}_ey$ and *-${}_ew$ before vocalic initials in the close-inflected type. This hypothesis is rather difficult to test, since word-final unstressed ${}_ey$ and ${}_ew$ were quite rare: there are no other instances in PIE declensional classes. This explanation is, at any rate, viable, and iterative syncope thus offers a way to account for an anomaly that has otherwise remained unexplained.

Taking into account the changes described above, after the development of interconsonantal ${}_eR/R_e$ to *R̥* the resulting PIE paradigms of 'sheep' and 'thought' should be reconstructed as in Table 2.3h. Excepting the locative singular of **Hewis* and the dative singular of **m̥ntis*, discussed below (§2.4), the desinences in the table correspond precisely to those reconstructed under the comparative method, and listed in Tables 2.3c and 2.3e.

The genitive plural of close-inflected *i-* and *u*-stems, it can now be seen, is of particular importance, as the desinential vowel is short: on the dialectal level, **m̥tiHom* gives **m̥ntiyom*, while **HewyoHm* gives **Hewyōm*. Why Szemerényi posits an original genitive plural ending with a short vowel for the close-inflected stems (as in Table 2.3c) is not clear to me, but this appears to be precisely correct. This genitive with short _o_ is then the source of the vocalism of the Celtic and Slavic genitive in _*-om_ (§2.1), while all other IE languages leveled _*-ōm_ into the close-inflected _i-_ and _u_-stems. Evidence for this claim is to be found in Greek, since the genitive plural of Attic _i-_ and _u_-stems accents the antepenult (e.g. πόλεων, πῆχεων), an anomaly that is not encountered in any other athematic class. Of course normally in Greek the accent is restricted to the last two syllables when the ultima is long. This one anomaly is understandable if the PIE close inflection was _*-iHom_, and the usual Greek ending -ων was not leveled into the Attic _i-_ and _u_-stem genitive plural until rather late. Cf. Schwyzer (1939–50:1.572), who explains the accent as analogical to the genitive singular; and see also §3.4 below.

sg.	nom.	_*Hewis_	_*mṇtis_
	voc.	_*Hewi_	_*mṇtey_
	acc.	_*Hewim_	_*mṇtim_
	gen.	_*Hewyos_	_*mṇtoys_
	dat.	_*Hewyey_	–
	loc.	–	_*mṇtey_
	instr.	_*HewyeH_	_*mṇteyH_
pl.	nom.	_*Hewyes_	_*mṇteyes_
	acc.	_*Hewyṇs_	_*mṇtins_
	gen.	_*HewyoHm_	_*mṇtiHom_

Table 2.3h. Late PIE paradigms of open- and close-inflected _i_-stems.

The instrumental is also of particular interest, for the support it lends the theory of syncope. In the Vedas there is more than one instrumental singular desinence for _i-_ and _u-_stems. The usual masculine _i_-stem ending is _-inā_, but five stems, all in the Rigveda, have _-yā_. Two of these are open-inflected stems, *pátyā* and *sákhyā*, and no other open-inflected *i*-stem is attested in the instrumental singular. Another is *ūrmyā́*, to *ūrmí-* ‘wave, billow’. Although this noun usually takes close inflections, it is not surprising to find here a relic open inflection, since the word has one more stem consonant than do most close-inflected *i*-stems, and so actually has a structure like an open-inflected stem: Pokorny (1959:1.1140) reconstructs **u̯l̥-mi-*, or in syncopic terms perhaps *$w_elH_emy_es$ (corroborated by the Avestan cognate *varəmiš*), so instr. sg. *$w_elH_emy\acute{e}H$. The fourth instrumental in *-yā* is *pavyā́* ‘felly’, which clearly has the structure of an open-inflected *i*-stem, but which is classed with the close-inflected stems on the basis of nom. pl. *paváyaḥ*—no other distinctively close- or open-inflected desinence is attested for this noun in the Rigveda, and so there is as much justification for classifying this stem with the open-inflected group as with the close-inflected. Finally there is *rayí-* ‘wealth’, to which is attested instr. sg. *rayyā́*, beside *rayínā*, each once in the Rigveda. Kuryłowicz (1935:36–7) has shown that this stem ought to be derived from PIE **reHy-*, which provides an alternation between, e.g., acc. sg. **réHim* > Vedic *rayím*, and gen. sg. **reHyós* (with analogical *e* for $_e$ by stem regularization, as with *arí-*, *ávi-*, and *krátu-*, above), giving *rāyáḥ*. Such alternations resulted in two separate paradigms for nouns of identical meaning, *rayí-* and *rāí-*, both stems having been extended throughout the paradigm, as pointed out by Wackernagel and Debrunner (1896–1954:3.214). This means that *rayyā́* is an analogical creation, formed by adding *-yā* to the stem *ray-* found in the nominative and accusative singular, etc. The form *rāyā́*, the phonologically regular reflex of instr. sg. **reHyéH*, is attested more than thirty times in the Rigveda. And so *rayyā́* is of no great phonological importance, though neither is it surprising that *rayí-* should be one of the five Vedic stems with an instrumental in *-yā*, since this was certainly an open-inflected *i*-stem before the loss of the laryngeal in the root.

The facts are even clearer as regards the *u*-stems. Four masculine stems, all in the Rigveda, add *-vā* in the instrumental singular, while all other stems add *-unā*. The four are *paśú-*, *krátu-*, *śíśu-*, and *paraśú-* ‘axe’. The first three are open-inflected stems; the last has open-inflected structure, though it is attested in the Rigveda with close inflections (gen. sg. *paraśóḥ*, acc. pl. *paraśū́n*). It should be remembered that already in the Rigveda the open inflections of *i*- and *u*-stems are nearly obsolete—except for fossilized *kŕ̥tvaḥ*, which became indeclinable, they are in fact preserved only in the Rigveda, and no later text. Likewise there is just one neuter instrumental singular in *-vā*: *mádhvā*, an open-inflected stem. There are no *i*-stem neuters of any sort attested in the instrumental singular in the Vedas. The feminine *i*- and *u*-stems have a different variety of instrumental singular endings, but these are a different problem altogether, and of small relevance here, since all open-inflected *i*- and *u*-stems are either masculine or neuter. The Avestan evidence is slight, but tends to corroborate this analysis: YAv. *haša* = Vedic *sákhyā*, and GAv. *xraθwā*, YAv. *xraθwa* (beside GAv. *xratū*) = Vedic *krátvā*.

All other Vedic masculine *i*-stems take *-inā* in the instrumental singular, which clearly then is the ending of the close-inflected type. The provenance of this inflection is disputed. The most popular view is that *-nā* has been adopted by analogy to the *n*-stem instrumental singular ending—see Brugmann (1897–1916:2.2.192), and for further references, with some other suggestions, see Wackernagel and Debrunner (1896–1954:3.148). But there is no reason to suppose the *n*-stem endings were ever analyzed as including the stem-final *-n-*: this would render the *n*-stem endings rather anomalous, while without the *-n-* they are no different from the endings of other athematic classes. Rather, *-n-* in the instrumental ending here appears to be a prop-consonant, a hiatus-filler that is encountered elsewhere in Indo-Iranian inflection. For example, the Indo-Iranian genitive plural ending *-nām* only follows vowels: the original ending *-ām*, without the nasal consonant, is retained in consonant-stem declension. Clearly, the *-n-* serves to fill the hiatus between a stem-final vowel and the desinence, and was inserted when in Indo-Iranian the genitive plural ending was standardized as **-aHm*, which had formerly been in alternation with **-Ham* and **-Hm*. The same function accounts for the *-n-* in the nom.-acc. plural of neuter *a*-stems: the original ending was **-eH* > IIr. *-ā* (as it is in Avestan, and usually is in the Vedas), and when the usual nom.-acc. neuter plural ending *-i* (<**-H̥*) from other classes was added analogically in Indic, *-n-* was inserted into the hiatus, giving Skt. *-āni.* This explanation also accounts for the Rigvedic neuter *i-* and *u*-stems with endings in *-n-*, e.g. Rigvedic dat. sg. *mádhune,* which became standard in the later language (Wackernagel and Debrunner 1896–1954:3.132). Apparently the normal athematic endings were simply added to stems with vocalic finals, and *-n-* was inserted: the *-n-*, for instance, is not found in the middle cases, where it would not have stood between vowels. This account also explains the present problem, the origin of the Indic endings *-inā* and *-unā,* since they, too, apparently were formed by adding the usual athematic instrumental singular ending to a stem with vocalic final. Why this analogical creation was necessary is explained by iterative syncope, which suggests that the PIE ending was *-eyH. This ending would most likely have given Indo-Iranian *-āy, and thus fallen together with the dative and locative singular (§2.4).

To conclude this examination of the instrumental singular, then, it may be observed that just as with all the other weakest cases, in the instrumental singular there is a difference between the open and close inflections of the *i-* and *u*-stems. This is an observation missing from the standard handbooks of Indic and Iranian grammar because the underlying regularity really only becomes discernible, and the apparent exceptions explicable, under the predictions generated by the theory of syncope.

Finally, there are the diphthongal stems, usually designated a subclass of the root-stems. However, it can now be seen that the diphthongal stems differ from other root stems in the same way that *i-* and *u*-stems do. The diphthongal stems in fact provide strong evidence for the columnar accent assumed for *i-* and *u*-stems before the accent shift. For instance, Skt. *gāúḥ* 'head of cattle' has the peculiar case-forms gen. sg. *góḥ* (=Av. *gāuš*) and acc. pl. *gā́ḥ* (=GAv. *gǻ*), pointing to PIE gen. sg. *g^{w}ows, acc. pl. *g^{w}ō(n)s. These forms become understandable once it is assumed that the diphthongal stems had the same columnar accent as their polysyllabic counterparts, the *i-* and *u*-stems. But when the accent shifted in the *i-* and *u*-stems, it was unable to shift in the diphthongal stems: e.g., Pre-IE gen. sg. *g^{w}áwa-s(a) is syncopated to *g^{w}áws, and acc. pl. *g^{w}áwa-m(a) to *g^{w}áwm(+s), leaving no other vocoid for the accent to shift to. The locative and dative singular fell together, and were redifferentiated by the analogical addition of the ending **-ey* in the dative, just as with the *i-* and *u*-stems (§2.4). This explains why there is a full-grade ending in Vedic dat. *gáve* (=GAv. *gavōi*, YAv. *gave* : Vedic loc. sg. *gávi*) but not in the genitive. This also explains why there is root accent in dat. *gáve*, instr. *gávā*, gen. pl. *gávām*, etc. (all with analogical desinences), even though this is a monosyllabic stem, and so should have accented desinence in the weak cases: in the original dative the accent did not shift, and the analogical addition of the ending **-ey* did not alter the place of the accent. As for the lengthened grade in the strong cases, this appears to have originated in acc. pl. **gʷowms*, where it may be assumed that *w* was lost in Proto-Indo-European before a final consonant cluster, with compensatory lengthening of the preceding vowel. The form **gʷōns* then developed to **gʷā́s* in Indo-Iranian. This analysis makes better sense of the Greek evidence: the usual reconstruction of the PIE accusative plural is not **gʷōns* but **gʷōs* (see, e.g., Schwyzer 1939–50:1.577, and Pokorny 1959: 1.482), presumably modeled after acc. sg. **gʷōm*, where it is assumed the diphthong **ow* has become **ō* before word-final **m*—the conditioning factor, one assumes, is in part the labiality or sonority of the final consonant. Therefore it is usually assumed that only Doric βῶς corresponds to Vedic *gā́ḥ* and GAv. *gā̊*, while Ionic-Attic βοῦς (in Homer beside analogical βόας) is modeled after acc. sg. βοῦν, which then, it must be supposed, is in its turn modeled after nom. sg. βοῦς. But now it is not necessary to assume that the PIE accusative plural was analogical. Rather, by Osthoff's law **gʷōns* gave Pre-Greek *βόνς, which then regularly gave Doric βῶς and Ionic-Attic βοῦς: cf. Doric τως acc. pl. def. article or demonstr. pronoun = Ionic-Attic τούς, Cretan-Argolid τονς; and Ionic μείς 'month' = Doric μής (<*μένς < **mēns*, cf. gen. μηνός). The form **gʷowms* predicted under syncope provides an especially probable environment for the loss of **w*, though conceivably the same loss could have occurred under some external sandhi conditions in the accusative singular, and certainly would have occurred under all conditions if the vocalism of the accusative plural was leveled into the accusative singular (cf. Gk. Ζῆν < **dyēwm*). With analogical extension of the long vowel into all the strong cases, the Proto-Indo-European paradigm then should have included nom. sg. **g^{w}ōws*, acc. **g^{w}ōm*, and acc. pl. **g^{w}ōns*, which are precisely reflected in Vedic and Avestan, and which would render Pre-Greek *βοῦς, *βῶν, and *βόνς. It is necessary only to assume then that in Ionic-Attic the vocalism of nom. sg. βοῦς and acc. pl. βοῦς (<*βόνς) was extended to the accusative singular, while in Doric the vocalism of acc. sg. βῶν and acc. pl. βῶς (<*βόνς) was extended to the nominative singular, which is βῶς in Doric. These separate analogical developments are rendered probable by the different developments of the accusative plural in Ionic-Attic and Doric, weighting in different directions the probability of which stem form would be generalized, by determining whether the stem βου- or βω- would predominate in the strong cases. This analysis is perhaps preferable to the usual explanation of the Greek forms, since it makes the non-Doric forms more phonologically correct, and so obviates some particularly complex analogical developments in those dialects, along with the assumption that Doric should be oddly less analogy-prone than all the other Greek dialects.

Vedic *dyāúḥ* 'heaven; day' has some weak case-forms like those of *gāúḥ*: gen.-abl. sg. *dyóḥ* and loc. sg. *dyávi*. The Avestan cognate is attested just once, gen. sg. *dyaoš*, precisely corresponding to the Vedic genitive. Lat. abl. *Iove* perhaps directly reflects the PIE locative, in which case it corresponds precisely to Vedic *dyávi*; but it can also be explained as analogical, since, at any rate, analogy has certainly played a role in the formation of the other cases in the paradigm, e.g. dat. *Iovī* (<**dyew+ey*) and acc. *Iovem* (<**dyew+m̥*: Leumann and Hofmann 1928:67). Beside this stem **dyew-* in the weak cases, there is another, **diw-*, which is considerably commoner in Vedic, e.g. in gen. sg. *diváḥ*, loc. sg. *diví*, etc. This is the only stem found in the weak cases of the Greek cognate, e.g. gen. sg. Δι(ϝ)ός : nom. Ζεύς < **dyēws*, cf. acc. Ζῆν. It is possible to explain the weak stem **dyew-* as an Indo-Iranian innovation modeled on the paradigm reflected in Vedic *gāúḥ*. But perhaps a more plausible solution is to assume that two originally separate but similar words existed side by side in Proto-Indo-European, one with columnar root accent, and the other with normal variable accent. The one meant 'heaven' and the other 'day'. Originally the two were formally identical in the strong cases (excluding the accusative plural), and that explains how the two paradigms fell together in Indic and Greek. There is evidence for this analysis in the fact that aside from the paradigms of Vedic *dyāúḥ* and Gk. Ζεύς, the weak stem **diw-* from this paradigm is reflected only with the meaning 'day'. It is attested in several languages, and in some Indic and Greek relic formations: Arm. *tiw* 'day'; Lat. *dius*, *interdius* 'by day, during the day' (from gen. **diwos*, with Latin syncope), *bi-duum*, *tri-duum* 'space of two (three) days'; Gk. ἔνδιος adj. 'at midday' (based on *ἐν διϝί, cf. ἐννύχιος 'in the night'); Skt. *dívā* 'by day' (originally instrumental of *dyāúḥ*, but with root accent: cf. gen. *diváḥ*, dat. *divé*). It is true that the stem **diw-* is found in some words associated with the meaning 'heaven' rather than 'day', but these words are not based on the weak stem of the paradigm in question. Rather, they are distinct formations belonging to other stem types: examples are Vedic *divám* 'heaven' (*o*-stem) and *divyá-*, *diviyá-* 'heavenly' = Gk. δῖος, Lat. *dius* 'divine' (*yo*-stems). One further piece of evidence for this analysis is the gender distribution in the Rigvedic paradigm. In the strong cases the word may be either masculine or feminine, while in the weak cases it is always masculine. The mixing of genders in the strong cases is comprehensible if there were originally two paradigms, since, as pointed out above, the two paradigms would have been identical in all the strong cases except the accusative plural. Clearly some changes have affected the Vedic gender distribution, since it is regulated by case rather than by stem, but it is easy to see how distribution by stem could have developed into distribution by case. For instance, the stem in the strong cases is always *dyo-* or *dyāu-*, except for two cases: weak stem vocalism in the nom. pl. *dívaḥ* (once in the Rigveda, beside normal *dyā́vaḥ* 22 times) cannot possibly be original, and so this form is most likely analogical to the other exception: acc. pl. *dívaḥ* (also *diváḥ*, each twice) is the etymological reflex of the accusative plural in the paradigm of the PIE word for 'day', with variable accent (but not 'heaven', with columnar accent, from which should be expected **dyā́ḥ*, though the actually attested form is *dyū́n* [24x]—see below, §3.3.4). In addition to being the only strong cases with weak root vocalism, these two exceptions are also the only feminine forms with stem _div-_. On the other hand, although the stem _div-_ is otherwise always masculine, so also the stem _dyo-_ in the weak cases is always masculine. It is to be supposed, then, that originally the two stems were of different gender, and a single gender was extended throughout the weak cases, thereby converting gender distribution by stem into distribution by case, and that explains why the stem _div-_ is feminine in the strong cases. The only internal evidence for identifying the original gender of the two is acc. pl. _dívaḥ_, _diváḥ_, pointing to feminine 'day' and masculine 'heaven'. The gender of the latter is corroborated by the maleness of the Indo-European sky deity. Significantly, the Vedic confusion of gender is paralleled in Latin, where _dies_ could be either masculine or feminine already in the preliterary period (Leumann and Hofmann 1928:368).

Usually grouped with the diphthongal stems is the stem reflected in Vedic _nāúḥ_ 'ship' (gen. _nāváḥ_), Doric Gk. ναῦς (gen. νᾱός, cf. Hom. νηῦς, gen. νηός), OIcel. _nór_ (gen. _nós_, dat. _nói_), OIr. _náu_ (_ā_-stem), Lat. _nāvis_ (_i_-stem), etc. But the word is rather unlike Vedic _gāúḥ_, inasmuch as it has variable accent, lengthened vocalism in the root throughout the paradigm, and no weak cases comparable to Vedic gen. _góḥ_. Reconstruction with a laryngeal explains all of these differences, in addition to accounting for the _a_-quality of the root vowel. If it is assumed that like the other diphthongal stems and _u_-stems this word originally had columnar accent that shifted in the weak cases, it is possible to reconstruct nom. *_náHawà-s(a)_ > *_náHwàs_ > *_néHw_$_e$_s_ > *_neHus_, and gen. *_náHawà-s(a)_ > *_náHwàs_ > *_nàHwás_ > *_n_$_e$_Hwós_. The stem vowel was regularized, as usual, and then after anteconsonantal *_-eH-_ developed to _ā_ in the weak cases and the nominative plural, this vowel was extended to the other strong cases. And so unlike the etymon of Vedic _gāúḥ_, this word had the proper structure for the preservation of a desinential vowel for the accent to shift to. Therefore the word for 'ship' formally bears a closer resemblance to the u-stems than to the diphthongal stems, and it is only the loss of the laryngeal that has made it seem like a diphthongal stem.

2.4. THE LOCATIVE SINGULAR. There is general agreement that the locative singular was a strong case in Proto-Indo-European, and yet it is considered a weak one in Vedic Sanskrit. Preliminary to explaining the locatives of *i-* and *u*-stems it is necessary to understand why the change took place and when. First it will be useful to review the reasons for classifying this case as strong in Vedic and weak in Proto-Indo-European.

For Sanskrit nouns and adjectives with variable accent, the locative singular regularly has the accent of a weak case, e.g. loc. sg. *padí* (cf. acc. sg. *pā́dam* 'foot'), and *bhuví* (cf. nom. pl. *bhúvaḥ* 'earth'). Likewise, in most stem classes with quantitative ablaut alternations, the locative singular regularly takes weak grade in the stem, while the strong cases take full grade, e.g. loc. sg. *pathí* (cf. acc. sg. *pánthām* 'path'), *bhávati* (acc. sg. *bhávantam* pres. part. 'be'), and *tasthúṣi* (acc. sg. *tasthivā́ṁsam* perf. act. part. 'stand'). The only counterevidence to classification of the locative singular as a weak case in Sanskrit comes from the *r-* and *n*-stems, where it has the vocalism of a strong case, e.g. loc. sg. *pitári* (acc. sg. *pitáram* : dat. sg. *pitré* 'father') and *rā́jani* (acc. sg. *rā́jānam* : dat. sg. *rā́jñe* 'king'). Contracted forms of *r-* and *n*-stem locatives (e.g. *rā́jñi*) are found frequently in the classical language, never in the Rigveda, and almost never in the Atharvaveda, and so such forms are clearly late analogical developments.

The popularity of the view that the locative singular was a strong case in Proto-Indo-European is undoubtedly due to general agreement with the opinion that the locative ending *-i* is a secondary suffix, added to an originally bare stem—see, e.g., Brugmann (1897–1916:2.2.179) and Burrow (1973:234). The basis for this view is that there are endingless locatives attested in both Indo-Iranian and Hellenic: e.g., in the Vedas appear both *kṣā́man* and *kṣā́mani* 'on the earth', and in Greek, *αἰέν* 'always' (cf. *αἰών* 'period of time'). The conclusion follows almost inevitably that the locative singular was a strong case in Proto-Indo-European: if the endingless form of the locative is older, then doubtless this was originally a strong case, because it is precisely the noun classes with endingless forms (almost exclusively *r-* and *n*-stems) that have strong-stem locatives in Vedic, regardless of the counterevidence of other stem types. All of this reasoning stands or falls on the original assumption, that *-i* is secondary, and that is an assumption that is difficult to justify. One source of doubt is suggested by the thematic locative ending **-oy*. As is generally recognized, the method of forming thematic endings was to add athematic endings to the theme vowel (§3.4). So, for instance, the theme vowel **-o-* plus the athematic accusative singular ending **-m* renders the thematic ending **-om*, while **-o-* plus the athematic dative singular ending **-ey* renders thematic **-ōy*. This means that if the thematic locative singular ending was **-oy*, the athematic ending was **-y*. The creation of the thematic endings was admittedly later than the establishment of athematic endings, but still **-y* must then have been the normal athematic ending before the onset of the dialectal period, and so the enormous variation in the form of the locative singular is unlikely to be due to the late and haphazard addition of **-y*. Rather, the inconsistencies from class to class of noun stems, and even within classes, bear the marks of a system disrupted by phonological change. Supposing such change can be demonstrated, it will be more plausible to begin with the assumption that the locative ending was consistently **-y*, as in fact Shields (1979) and Szemerényi (1980:150) assume. Given that assumption, the patterns of vocalism predicted by the theory of syncope are capable of accounting for the variety of locative types.

Beginning with the assumption that the locative singular was originally a strong case in Proto-Indo-European, it may be supposed that it became a weak case not long after the application of syncope, by a shift of accent. As with the accent shift in the accusative plural, the motivation was to regularize the accent in the paradigm, to form a pattern whereby the nominative, vocative, and accusative of both the singular and the plural (and, probably later, the dual) had the accent of strong cases, while all other cases had accented desinences. And so the locative singular did change from a strong to a weak case, and it is only a matter of moving that change back from the Proto-Indo-Iranian period into Proto-Indo-European itself. In fact, all evidence from other IE branches corroborates that assumption, since it all points to desinential accent. The Greek dative formally reflects the PIE locative, and Greek root-stems accent the desinence in the dative, e.g. φλεβί 'vein', τριχί 'hair', and ἁλί 'salt'. The accent of Greek *n*-stems is not movable; on the free variation between

-έρι and -ρί in *r*-stems, see below. The accent of Lithuanian *i*- and *u*-stem locatives is necessarily secondary, since the ending *-je*, which bears the accent, is a Lithuanian innovation, e.g. loc. sg. *avyjè* (cf. Latv. *avī*) and *sūnůjè* 'son' (cf. Latv. loc. sg. *tìrgū* 'market', with columnar accent). However, desinential rather than root accent is in itself suggestive (cf. nom. pl. *ãvys* 'sheep'), and the suggestion is borne out by the accent of Russian *a*-stems, which corresponds in general to the accent of Sanskrit and Greek nouns with variable accent: cf. Russ. loc. sg. *zemljá* 'earth', as opposed to acc. sg. *zémlju*.

In conjunction with syncope, this accent shift explains why *r*- and *n*-stems have strong stems in the locative singular, while other stem types have weak-stem locatives. In the strong cases these stems accented the vowel immediately before the *-r-* or the *-n-*, and so the accent could not shift to the desinence: e.g., the locative of stems with the suffix **-ter-* ends in *-tari* in the Vedas, from **-tery* < Pre-IE **-tára-y*. Before the creation of syllabic resonants—that is, after syncope, but before the reduction of vowels with secondary stress to *$_e$—anteconsonantal word-final *y* might be lost before consonants in external sandhi, having no syllabic allophone: cf., e.g., the loss of *m* in Vedic instr. sg. *áśnā* < PIE **Hek̂mneH* (§3.2.2). That explains why endingless locatives vary freely with those in *-i* among the Vedic *n*-stems. At one time they apparently did among liquid stems, as well. In the Vedas, endingless liquid-stem locatives are limited to five instances of loc. sg. *svàḥ* (*svàr* < **suHel*) 'sun', but more instances can be deduced from compounds, e.g. *áhar* 'day' in *áhar-divi* 'daily', and *vánar* 'forest' in *vanar-gú* 'roaming in the forest': for an extensive list of such forms see Bartholomae (1888). Brugmann (1897–1916:2.1.178) considers these compounded locatives better analyzed as accusatives, but to a sure endingless locative Av. *dvarə* 'door' he compares adverbs such as Skt. *antár*, Lat. *inter* 'within', and Gk. ὕπερ 'above', and suggests a similar origin for them. For other suggested locatives of this type see Benveniste (1935:87–99). Endingless *s*-stem locatives also occur, but are rather rare, e.g. Doric αἰές 'always' (cf. Hom. αἰεί, Attic ἀεί < *αἰϝέσι, and the Attic accusative αἰῶ < *αἰϝόσα), and Lat. *penes* 'in the keeping of' (cf. *penus, -oris* 'provisions').

Under this analysis it should be expected that root-stems with the strong stem structure *(C)CeC-* would have locatives of the form *(C)CéCy*, while those with the structure *CeRC-* would have *CR̥Céy*. This latter form would be indistinguishable from the dative, and so presumably **-ey* was replaced by **-y* from the other locative singular type. However, there is perhaps some evidence for an original **-ey* in the locative singular. The reflex of a locative ending **-ey* is occasionally encountered in Iranian, e.g. YAv. *zəme*, *(xrūždi-)sme* (to *zå̆* 'earth') and GAv. *ha-dəmōi* 'in the same house'; for others see Bartholomae (1894:125). Vedic *-e* appears to be a locative ending in āmreḍita compounds like *divé-dive* 'every day' and *viśé-viśe* 'in every house'—cf. MacDonell (1910:155), who less probably remarks, 'The frequency of *-e* as locative of *a*-stems led to the occasional use of the dative in consonant stems; *div-é-div-e* (for **div-í-div-i*) and *viś-é-viś-e* (for **viś-í-viś-i*).' This solution also helps to explain how the Greek dative could have come to reflect the PIE locative. Such a development is better understandable if the locative and the dative were formally identical wherever the locative ending was **-ey*. It will also be shown that the dative and locative singular were consistently the same in the *i*- and *u*-stems (see below), as well as the *ī*-, *ū*- and *ā*-stems (§3.4). Given such extensive formal identity, it is not difficult to see how the two cases could have fallen together in Greek, a single set of endings being generalized.

There is perhaps also some evidence for a locative ending **-ey* in Slavic. There is no trace of a locative ending **-i* in Slavic unless, as Ferrell (1967) contends, the Common Slavic adverbial ending *-ь* arose from this. Slavic consonant-stems show two locative endings, *-i* and *-e*, with no clear-cut distributional pattern, e.g. OCS *kameni* 'stone' and *dьni* 'day' are in free variation with *kamene* and *dьne*, respectively. The latter ending perhaps represents a postpositional element added to an endingless locative; otherwise the endingless locative is unattested in Balto-Slavic. The locative ending *-i* could be identical to the Baltic *i*-stem locative desinence *-ī*, but in that event both endings are more mysterious than ever, since they must reflect PIE **-ī*, which is clearly not a PIE consonant-stem locative ending. On the other hand, Slavic

-i could as well reflect PIE **-ey*, a consonant-stem locative ending for which there is some evidence in Indo-Iranian.

It should now be possible to explain the *i-* and *u*-stem desinences. The Vedic ending for both open- and close-inflected *u*-stems is *-āu*, though *-avi* is also used. In the Rigveda the close-inflected *i*-stems take *-ā* or *-āu*, the former generally before a consonant, and the latter at the end of a pada or (as *-āv*) before a vowel. The open-inflected *i*-stem ending is attested just once in the Vedas: the Rigveda has two instances of *pátyāu* 'husband' (beside *pátāu* once in the Atharvaveda). It is generally assumed that *-ā* reflects the original *i*-stem ending, and *-āu* has been extended from the *u*-stems.[11] In that event *-ā* ought to reflect PIE **-ēy*, since the latter is the ending that the combined evidence of Greek and Gothic points to (§2.3), and the ending that congruity with the *u*-stems suggests. The loss of **-y* in this ending can be attributed in part to external sandhi variations. Brugmann (1897–1916:1.1.203 n. 1; 1.2.882–3) hypothesizes that in Proto-Indo-European the long diphthongs lost their second elements before consonants and in pausa, but not before vowels. Thus both nom. *dvā́* and *dvāú* 'two' appear in the Vedas, alternating under conditions like those governing the variation in the Rigvedic *i*-stem locative endings. But the loss of *y* in the ending **-āy* is not limited solely to any particular external sandhi environment, and it can perhaps be argued that Indic shows the further innovation of having lost word-final *y* (but not *w*) after all PIE long vowels. This rule seems quite regular, once the effects of laryngeals are factored out. The evidence is as follows:

In the dative singular of thematic stems, which had **-ōy* in Proto-Indo-European, the only Sanskrit ending is *-āya*. If the PIE thematic dative ending had been allowed to lose its final **-y* in Indic, this case would have fallen together formally with the nominative dual. One supposes the final *-a* was added to the Indic dative ending to prevent that syncretism. The Avestan evidence supports this analysis, since there are some Avestan thematic datives in *-ā*, final *-y having already been lost, e.g. *vasnā* 'will'. Since the usual thematic dative ending in the Avesta is *-āi*, perhaps the best explanation is that Avestan reflects the PIE situation, with variation between *-ā* and *-āi* originally conditioned by sandhi, while Indic has carried through the complete loss of *-y* in word-final long diphthongs. Iranian also corroborates the Sanskrit locative ending *-ā* < **-āy*: cf. GAv. loc. sg. *vīdātā* 'placement, distribution', and OP *ahifraštā* 'hard justice', beside the Younger Avestan ending *-ā̊* = Skt. *-āu*. Exceptions to the rule that Indo-Iranian **-āy* became *-ā* in Indic all seem to entail the loss of a laryngeal, and so it may be supposed that **-āy* became *-ā* before the loss of hiatus where the laryngeal had been. (It should be remembered that although the loss of laryngeals ought to be dated to Proto-Indo-Iranian, the contraction of two vowels after loss of an intervocalic laryngeal was still not complete in Vedic times: cf. forms like *pā́ntu* and *déṣṭha-* [above, §2.1], and see Kuryłowicz 1935:33-40). For example, in the present subjunctive middle of thematic verbs, the Sanskrit termination *-āi* is proper only to the first person singular, whence it has been extended randomly to other persons and numbers. This is easily demonstrable from the comparative evidence, and particularly from Avestan, where the first person singular ending is *-āi*, while all other persons and numbers end in GAv. *-ē*, YAv. *-e*. Since the PIE primary first person singular middle ending was **-Hey* (Hitt. *-ḫḫa-*), the thematic ending ought to be reconstructed as **-ē-Hey* (where *ē* is the PIE result of the contraction of the theme vowel with the subjunctive vowel), and therefore Skt. *-āi* does not violate the rule about PIE **-ēy* in Indic. In the corresponding athematic forms there are endings both with long and short vowels—irregularly in Vedic, but once again in an orderly fashion in Avestan. There normally the subjunctive vowel contracts with the desinential vowel after loss of the laryngeal: e.g., GAv. *aojāi* (to *aog-* 'proclaim') reflects **(H)ewg*^{w}*h-e-Hey*. The ending with short diphthong appears only when an intrusive *n* is inserted between the subjunctive marker and the personal ending, preventing contraction, e.g. YAv. *stavāne*, to *stav-* 'praise'. Likewise Vedic dative infinitives formed directly from roots usually take *-e*, but seṭ roots in full grade take *-āi*, e.g. *parā-dāí* 'to give up' (<**-deH-ey*). The origin of the long vowel in the dative infinitive ending *-āi* in derivative stems is unknown, and this ending may be based on the seṭ root ending. As for the dative pronouns, feminine demonstratives like Vedic *tásyāi* and *asyāí* certainly contained a laryngeal, while the source of the long vowel in the corresponding masc. *tásmāi* and *asmāí* is unknown, and could as well be due to a laryngeal as to a PIE long vowel. Finally, the Sanskrit *ī*-stem dative singular ending *-yāi* must contain a laryngeal, since the stem-forming suffix in this class is PIE **-yeH-* (§3.4). And so once the effects of laryngeals are taken into consideration, there does not seem to be any solid counterevidence to the general proposition about the reflex of word-final long *y*-diphthongs in Indic, and it may be stated as a rule, with the regularity of a Neogrammarian sound law: PIE **ēy* in word-final position gives Sanskrit *ā*. This should not be a surprising development, since other resonants, in addition to *y*, are lost under the same conditions in Indic, e.g. in the nominative singular of *r*- and *n*-stems.

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[11] Wackernagel (1897:54) supposes this analogical change began in Proto-Indo-European rather than in Proto-Indo-Iranian, thereby explaining the ϝ in Cypriot πτόλιϝι. But complex additional changes are required to arrive at this form, and the general substitution of the locative ending for the dative in Greek argues against it: it is assumed here that Hellenic inherited identical locative and dative singular inflections in the *i*-stems.

Given that Vedic *-ā* in the locative singular of close-inflected *i*-stems reflects PIE **-ēy*, Szemerényi (1980:110) is no doubt right to derive the latter from PIE **-eyy*, in accordance with his theory of the origin of PIE lengthened grade as compensatory lengthening upon the reduction of geminate consonants. Szemerényi himself regards the *u*-stem ending **-ēw* as analogical to *i*-stem **-ēy*, but it has been frequently argued that **-ēw* is the result of some regular phonological process whereby loss of the final semivowel is compensated by lengthening: see, e.g., Kuhn (1869:361), Lanman (1877:387), and MacDonell (1910:296). It may well be that after syncope, but before the reduction of vowels with secondary stress to *$_e$ and the rise of syllabic consonants, word-final **-awy* before consonantal initials was assimilated to **-aww*, since *y* had no syllabic allophone. These are the same conditions under which the locative ending **-y* was assumed to have been lost in the *r*- and *n*-stems. It would not be surprising for such an assimilation to affect the *u*-stems but not the *r*- and *n*-stems, since *y* and *w* are consonants of equal aperture (or 'strength' in the terminology of natural generative phonology: see the consonantal strength scale devised by Hooper 1976:205–7, with references), and there are none of greater or equal aperture. An advantage of this analysis is that it obviates the necessity of assuming that the alternative Vedic *u*-stem locative ending *-avi* is analogical, as is usually assumed. Rather, this is the reflex of **-ewy* before vowels, with *y* vocalized later, just as with the accusative singular ending **-m*. This solution also explains very well why there is lengthening in the locative ending *-āu*, but none in *-avi*, with which it is in free variation.

The close-inflected *i*-stem locative ending **-eyy* that Szemerényi reconstructs also happens to be the one predicted by the analysis of the locative presented here, a claim of which is that the *i*- and *u*-stem dative and locative endings ought originally to have been identical after the *i*- and *u*-stem accent shift. It is the formal identity of the two cases, then, that prompted the reshaping of the dative in the close-inflected types. The locative desinence in other athematic classes was **-y* after syncope, while the dative was **-ey*. Naturally, then, **-ey-y* was regarded as the correct termination for an *i*-stem locative, but an unusual dative one, and so arose **-ey-ey* in the dative, e.g. in Vedic *agnáye* 'fire', YAv. *anumatə̄e* inf. 'to think alike', Hom. πτόλει 'city' (twice trisyllabic, with -εϊ < *-ε[ι̯]ει: Schwyzer 1939–50:1.572). Meillet (1914) argues that since the Balto-Slavic and Latin *i*-stem dative ending reflects **-ey* (e.g. Lith. dial. dat. sg. *ãvie*, Lat. *ovī* 'sheep', OCS *pǫti* 'way'), this should be derived from **-eyey* by haplology, since the corresponding *u*-stem datives in Slavic and Latin do agree with Sanskrit in reflecting **-ewey*, e.g. Skt. dat. sg. *sūnáve*, OCS *synovi* 'son', Lat. *domuī* 'house'.

This analysis of the dative and locative of the close-inflected *i*- and *u*-stems is corroborated by the expected complementary change in the open-inflected stems. Here the dative and locative should be expected originally to have ended in **-yey* and **-wey*. Since formal identity of the two cases prompted some sort of analogical redifferentiation, and since **-ey* was consistently the dative ending in other noun classes, while it was only occasionally the locative ending (as argued above), it was natural for the locative rather than the dative to undergo analogical replacement in the open-inflected stems. That does appear to be what happened, given the evidence of the Vedic datives *krátve* and *pátye,* as opposed to the locatives *krátāu* and *pátyāu,* which appear to have borrowed *-āu* from the locative of close-inflected *u*-stems. The last of these forms is of particular importance, because of the much-discussed fact that the form is *pátyāu* rather than *pátāu* (though the latter does appear once in the Atharvaveda, perhaps under the influence of the compounded stem). One expects, then, that if the ending *-āu* is analogical, as it assuredly is, the ending it replaced had been attached to a stem *páty-* rather than *pát-*. And so the original locative cannot have been structured like the close-inflected locative, which had *-ā* < **-ē(y)* attached to a stem without final *y*. Therefore it is quite probable that the original locative was **potyey,* as projected here.

CHAPTER THREE: COMPLEX DECLENSIONAL STEMS

3.0. SIMPLE AND COMPLEX STEMS. The stems examined so far are simple stems inasmuch as they either carry no suffix or carry only suffixes that behave accentually as if they were not suffixes at all, but part of the root morpheme. The Pre-IE suffixes **-ya-* and **-wa-* have no inherent accent, but conform to the secondary stress rule as conditioned by the primary accent of the root, with the result that PIE *i-* and *u*-stems underlyingly show a regular, recurrent pattern of biconsonantal clusters. All the remaining declensional stems to be examined are COMPLEX stems, since they carry suffixes with inherent accentual properties of their own.

3.1. PRINCIPLES OF ACCENTUATION IN PRE-INDO-EUROPEAN. It has been a common assumption among Indo-Europeanists that in Proto-Indo-European the accent of complex stems could alternate not only between the stem-forming suffix and the desinence, but between the root and the desinence, as well.[1] So for instance Pokorny (1959:1.505) reconstructs a strong stem **yénəter-* '(husband's) brother's wife', alternating with weak **y*$_e$*nətr-* (**yn̥̄tr-*). This alternation is not attested in any language, but since both stems are reflected, one or the other having been generalized in each reflecting language, presumably they originally belonged to a single paradigm, e.g. the strong stem in Gk. ἐνάτηρ (Hom. nom. pl. εἰνατέρες, with metrical lengthening—and for εἰνάτερες, according to Herodian, περὶ μονήρους λέξεως) and Lith. *gentė*, *žentė* (for **jentė*, reflected as Eastern Lithuanian *intė*, and cf. Latv. *ietere*, all showing effects of the regular loss of *j* before *ie* < **en*), and the weak stem in Skt. *yā́tar-*, Phrygian acc. ιανατερα, Serb. *jêtrva*, and Lat. **janiter-* (on which *janitrīcēs* 'brothers' wives' is based). But in fact this stem is quite unusual, since all other *r*-stem kinship terms reflect the same ablaut grade of the root in all reflecting languages, e.g. consistent weak grade in **pH̥-ter-* 'father' and **dhugH̥ter-* 'daughter', consistent strong vocalism in **meH-ter-* 'mother' and **bhreH-ter-* 'brother'. The same consistency is encountered among the *n*-stems. For instance, stems in PIE **-men-* almost always have full grade of the root, in all attesting languages, in those stems that certainly derive from Proto-Indo-European (see Brugmann's examples, 1897–1916:2.1.234–7). And in those few instances in which the root is in weak grade, the cognates are in consistent agreement: e.g., to Vedic *vidmán-* 'knowledge, attention' cf. Gk. ἴδμων 'skilled' (better, ἰδμήν· φρόνησιν Hesychius); and to Vedic *sīmán-* 'parting of the hair', Classical 'boundary', cf. OIcel. *sími* 'cord' (OE *sīma*, OS *sīmo*), Mod. 'telephone', suffixed in Gk. ἱμονιά 'rope of a draw-well'. If the roots of such forms originally alternated, paradigm regularization must have applied in Proto-Indo-European itself. But in that event why were root alternations in this one form **yenHter-* preserved into the dialectal period? If all that can be said is that **yenHter-* is just somehow different, then in fact it is better evidence against than for widespread root alternations in complex stems. If, for instance, this word is thought to show root alternations by analogy to root-stems, then it is easier to understand the word as an analogical creation than as the one *r*-stem that preserves the alternation by means of that analogy. Similarly, because stems in **-en-* generally show reduced-grade roots while those in **-men-* show full-grade, it is perhaps slightly more credible that the difference is an original one than that the two classes have leveled in opposite directions. The only other evidence for original root alternations is a very small number of forms such as Gk. λιμήν 'harbor' beside λειμών 'meadow', and ἀυτμήν 'breath; blast of bellows' beside ἀετμών·

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[1] See, e.g., Kauffmann (1887:544), Osthoff (1881a:203; 1881b:299), and Brugmann (1889:343, 357; and cf. 1897–1916:2.1.233, 293), with the references provided there.

τὸ πνεῦμα (Hesychius; see Brugmann 1889:343), which need not ever have been in paradigmatic alternation.

Certain theoretical problems also attend the assumption that roots originally showed quantitative ablaut alternations in complex stems. Supposing weak **pH̥-tr-* originally alternated with **peH-ter-*, it must be assumed either that the strong stem originally bore two accents or that full grade of the suffix is analogical. While it is not unthinkable that the strong stem should have borne two accents, it is then difficult to explain why in the weak cases the word bore just one. And while it is also not intrinsically improbable that the vocalism of *-*ter*- should be the result of analogy, it is still simpler to dispense with analogy and assume the suffix originally bore stress.

Beginning with the assumption that in complex stems only the suffix originally showed apophonic alternations, it is possible to explain quantitative ablaut in all declensional classes on the basis of a model of the Pre-IE accent based on a parallel in a natural language, Classical Greek. It was pointed out above (§2.2) that the case endings are generally thought to have been separate words at one time. These Pre-IE words will be designated CASE-WORDS, as opposed to the ROOT-WORDS or STEM-WORDS that formed the stem. The accent and ablaut differences between strong and weak cases may be attributed to the inherent accentual properties of the case-words. The case-words that formed the weak cases threw their accent onto the last syllable of the preceding word, just as enclitics do in Greek: e.g., the enclitic indefinite pronoun τὶς throws its accent onto ἄνθρωπος 'man', giving ἄνθρωπός τις 'a certain man'. Among root-stems, presumably in Pre-Indo-European the stem-word had its own accent before it acquired the accent of the enclitic. Later, but still before syncope, its own accent was eventually lost under the general principle that a single Pre-IE word (containing no open juncture) ought to have a single primary accent—and the two elements did come to be perceived as a single word. This principle of the elimination of one of the two accents will be called POLYTONY. It is a common phonological process in natural languages, and is even found at later stages in Indo-European development, e.g. in the accentual treatment of the verb augment (§4.2), and in most Vedic compounds. In Pre-Indo-European it is always the former of two accents that is eliminated in polytony. Thus dative singular *CáCaCaCa* + *yá* gives *CáCaCaCá-ya* by enclisis, then *CaCaCaCá-ya* by polytony, and after apocope, secondary stress assignment, and syncope, the result is *CC*$_e$*CCéy*.

The case-words that formed the strong cases carried no accent at all, and so did not affect the accentuation of the stem-word. So also in Greek there are words that carry no accent and do not affect the accentuation of other words—the so-called proclitics, a term of modern invention—though in Greek the proclitics form a sense-group with the following word rather than the preceding one. The Pre-IE equivalents of the Greek proclitics will be designated the ATONIC CLITICS, since they bear no accent, while the enclitics that throw their accent onto the preceding word will be called TONIC CLITICS. Thus in the nominative singular, *CáCaCaCa* + *sa* gives *CáCaCaCa-sa*, and eventually *CéCC*$_e$*Cs*. That the strong cases should be formed with atonic clitics and the weak with tonic clitics is doubtless because the two types of case-words originated in different functional categories: the nominative and accusative case-words are usually thought to derive from pronouns, and the others from postpositions.

This analysis applies to the root-stems, while as regards the *i*- and *u*-stems, apparently the Pre-IE morphemes **-ya-* and **-wa-* were incapable of receiving the primary accent from the following tonic clitics in the weak cases: the reason presumably is that they were themselves atonic clitics. Thus protected from the effects of the tonic case-words, the stem accent of *i*- and *u*-stems remained columnar up to the time of syncope. (Though **-ya-* and **-wa-* were not capable of receiving the accent from the tonic case-words, the latter still doubtless lost their accent, just as monosyllabic enclitics do in Greek even when the preceding syllable cannot be accented, e.g. in λόγος τις 'a certain word', as explained below.)

The suffixes of complex stems, also originally separate words, had inherent accentual properties in Pre-Indo-European: some were tonic clitics, and the others were not enclitic at all. So for instance the Pre-IE etymon of Latin nom. sg. *frāter* comprises three morphemes, **bharaHa* + *tara* + *sa*. All three were at one time separate words, the first two bearing their own immobile primary accent (**bharáHa* and **tára*), the third being atonic. When the three words combined to form a single word, the two primary stem accents remained intact until after the application of syncope, with the result that there are two full-grade vowels in the PIE stem **bhreH-ter-s* < **bharáHa-tára-s*. Given the principle of polytony above, the clear implication is that the juncture between the second and third elements of the word was relatively close, while that between the first two was relatively open until after syncope. This junctural difference of course is to be expected, since **-sa* was enclitic while **-tara-* was not. Historically, then, it should probably be assumed, **tara* and **sa* combined to become a single word before **bharaHa* lost its status as a separate word, though all three morphemes constituted a single word before the application of apocope. Cf., for instance, how OE gen. sg. *Swana-wīces* (place name, Mod. *Swanage*) has close juncture between the element *wīc* 'dwelling-place' and the genitive singular inflection *-es*, and open juncture between the two elements of the compound, as demonstrated by the genitive plural inflection attached to *Swana-*. Inflection of the first element of compound place names is common in Old English: cf. *Hrofes-ceaster* (Mod. *Rochester*), *Cippan-hām* (Mod. *Chippenham*), etc. Pre-IE **bharaHa-tara-sa* thus more closely resembles PIE compounds, whose first elements are uninflected.

In the dative, the tonic case-word threw its accent onto the second vowel of **tára*, giving **tárá-y*, and under polytony the former of the two accents was eliminated. Thus results the characteristic accentual alternation between what later came to be stem and desinence, nom. sg. **bharáHa+tára-s* > **breH-ters*, and dat. sg. **bharáHa+tará-y* > **bhreHtrey*.

In addition to suffixes like **tara* there are those that were enclitic, such as **ra* and **na*. The latter forms *n*-stems: e.g., nom. sg. **wárasa + ná + sa* gives **wárasá-na-sa* by enclisis, then **warasá-na-sa* by polytony, and eventually PIE **wₑrsens* > **wr̥sēn* > Skt. *vŕ̥ṣā* 'bull'. In the dative singular, **wárasa + ná + yá* gives **wárasá-ná-ya*, where the second accent has been thrown onto the preceding syllable by **-na-*, and then **-na-* itself has received the accent of enclitic **-ya*: cf. how in a series of successive enclitics in Greek ('synenclisis') the accent of each will move one word to the left, leaving the last unaccented, as in εἴ πέρ τίς σέ μοί φησί ποτε (the example is Herodian's; but cf. Allen 1973:244). Under polytony the dative form becomes *warasa-ná-ya, eventually giving PIE *wr$_e$snéy > *wr̥sney > Skt. vŕ̥ṣne. It can be seen now that because *na is enclitic, due to polytony *n*-stems ought always to have weak-grade roots, and in fact they usually do. On the other hand, stems formed with non-enclitic suffixes ought not to be affected by polytony; so it is not surprising that stems in *-men-, formed with Pre-IE non-enclitic *mana (itself apparently formed from non-enclitic *ma plus enclitic *na) for the most part have full-grade roots.

Yet not all stems with non-enclitic suffixes have full-grade roots, e.g. *pH̥-ter- and *dhugH̥-ter-. The explanation for this irregularity takes the form of a second accentual principle in addition to polytony. In Greek there is a general rule that two acutes may not stand in adjoining syllables. So for instance when enclitic τὶς stands after a paroxytone like λόγος the result is not **λόγός τις (like ἄνθρωπός τις) but λόγος τις 'a certain word'. The final syllable of a perispomenon may receive the accent of the enclitic (e.g. παῖδές τινες 'certain children') because, for accentual purposes, a circumflected vowel or diphthong is equivalent to a geminate vowel with an acuted first element. The Greek elimination of one of two adjoining acutes was not originally limited to the results of enclisis, since the barytonesis of oxytones before non-enclitics within a phrase in the Byzantine accentual system seems to be due ultimately to the same cause. The somewhat different Alexandrian system corroborates this assumption: for details see Schwyzer 1939–50:1.386–7 (esp. Zusatz 1, with references), who concludes that originally a final acute was always converted to a grave before an accented initial, and in the Alexandrian system the rule was extended to all monosyllables within a phrase, regardless of whether the following initial was accented, but became restricted in its application in regard to words of more than one syllable. This principle of elimination of one of two successive accents will be referred to as HOMOROTONY. Note that in Greek, it is the second of two accents in the same word (i.e. as the result of enclisis) that is eliminated in homorotony, while it is the first when the two straddle a word boundary.

Homorotony in Pre-Indo-European eliminates the first of two adjoining accents. This explains why there are a few stems in *-men- with weak roots: they originally had root-final accent, e.g. Pre-IE **wayadá* + *mána* gives neuter *wayada+mána* by homorotony, and so PIE **wy*$_{e}$*dmen* > Skt. *vidmán-*. Likewise, PIE forms such as **pH̥ter-* and **dhugH̥ter-* apparently also suffered homorotony.

Whether a given Pre-IE word functions as a tonic clitic, an atonic clitic, or a non-clitic is largely predictable on the basis of sentence accent. In Proto-Indo-European, finite verbs apparently were of low prominence as regards sentence accent, while nouns and adjectives were prominent (Brugmann 1897–1916:1.2.951–4). (Degree of prominence here refers simply to the fact that not all primary accents in a sentence are equally emphatic, regardless of whether emphasis amounts to a property of pitch or stress.) This, for instance, is the situation in the Vedas, where non-initial finite verbs are enclitic in independent clauses; and it is true in all modern Germanic languages, and dating back to the earliest Germanic records, as indicated by the patterns of poetic meter and alliteration. PIE pronouns apparently occupied a middle position between nouns and verbs, having both enclitic and non-clitic forms, as in Greek and Sanskrit. Supposing the same relative scale obtained in Pre-Indo-European, an organized clitic pattern emerges. Tonic clitics throw their accent onto declensional stems, since the stems carried greater accentual prominence than the clitics themselves, regardless of whether those clitics were pronominal, adverbial, or particulate in origin. Accordingly, none of the original case endings is non-enclitic, since all Pre-IE case-words necessarily were less prominent in terms of sentence stress than the nouns and adjectives to which they became attached. On the other hand, there are no tonic clitics attached to verb stems: the personal endings either have no accent (i.e., reflect atonic clitics) or are non-clitic. This distribution makes sense if the personal endings were originally pronouns, as is generally supposed, since verbs are accentually less prominent than non-enclitic pronouns (i.e. the non-clitic endings), but are more prominent than enclitic pronouns (that is, the atonic clitics that formed the unaccented endings).

So, too, in declension non-clitic suffixes tend to have readily identifiable semantic properties. For example, PIE **-ter-* forms nomina agentis and kinship terms, some of the latter having originally been nomina agentis, e.g. **pH̥ter-*

from the Pre-IE root **paHa-* 'protect', as in Hitt. 1. sg. *pa-aḫ-ḫa-aš-mi* 'protect' and Skt. *pāti* 'protects'. Thus Pre-IE **tara* almost certainly was originally a noun, just as, for instance, Eng. *-man* was originally a separate noun in *workman*, *Englishman*, etc. Similarly, PIE **-men-* forms nomina actionis, and so this very likely was also a noun in Pre-Indo-European. On the other hand, the semantic properties of tonic clitic suffixes are not as clear. Particularly ill defined is the PIE suffix **-n-*: Brugmann remarks, 'Die geschlechtigen *en*-Nomina waren von uridg. Zeit her vorzugsweise Bezeichnungen von Lebewesen, die neutralen *en*-Substantiva irgendwelche Gegenstandsbenennungen, z.B. Körperteilnamen' (1897–1916:2.1.292); and Schwyzer suggests, 'In den etymologisch durchsichtigen Bildungen hat das Suffix seit alters substantivierend-individualisierende Bedeutung' (1939–50:1.486). Given the relative semantic vagueness of Pre-IE **-na-*, it is less likely to have been a noun; or, at any rate, if it was originally a noun it must have become a mere suffix long before **tara* and **mana* did. And so it is not surprising that **-na-* is enclitic, while **-tara-* and **-mana-* are not.

This relationship between the functional class of a morpheme and its accentual behavior in clisis is of the first importance in establishing the credibility of the theory of Pre-IE accentuation presented here, since it can now be seen that the theory is not motivated solely by its ability to generate forms to which syncope will correctly apply. Rather, it has independent motivation in the observed prosodics of natural languages, and so might be regarded as plausible regardless of the plausibility of the theory of iterative syncope.

3.2. THE *N*-STEMS. These are of two types, those formed with the suffixed element **-en-*, and those in which **-en-* is part of a larger suffix, the most common suffixes being **-men-* and **-wen-*. The ablaut differences between the two types demonstrate well the Pre-Indo-European accentual principles outlined in the preceding section.

3.2.1. *Stems in *-en-*. The PIE stems in **-en-* are not a very productive class in Vedic Sanskrit, and so this class serves well to illustrate the effects of syncope. As remarked above (§3.1), these stems generally show weak grade of the root. Of the 45 stems listed by Wackernagel and Debrunner (1896–1954:2.2.176–9), including *r/n*-stems, *i/n*-stems, etc., 20 have clearly weak-grade stems, showing either zero grade of the root or a syllabic resonant, e.g. *ukṣán-* 'bull', *plīhán-* 'spleen', *śván-* 'dog', etc. The accent is usually on the stem-forming suffix, though there are several exceptions in which the accent must have shifted, e.g. *vŕ̥ṣan-* 'bull', *yúvan-* 'youth', and *ū́dhan-* 'udder'. Another, *sakthán-* 'thigh', only appears to reflect full grade, though in fact the etymon is **sn̥g-th-*; and three more may be supposed to reflect syllabic nasals before resonants: *kanyán-* 'virgin' (cf. Gk. καινός 'new, fresh'), *dhánvan-* 'bow', and *dhánvan-* 'desert'—though these are in fact probably stems in **-yen-* and **-wen-* (see Meillet 1937:156–7), and so may reflect full-grade roots. Likewise **vanan-* in *vánan-vat-* 'possessing; belonging to oneself' probably derives from the root *van* 'win' (Grassmann 1964:1207), in which case it may reflect **wn̥Hen-* (cf. Vedic part. *-vāta-*, Class. *vanitá-*); but the etymology is 'unklar' (Wackernagel and Debrunner 1896–1954:2.2.179). Nearly all the remaining roots do not in related forms show any weaker grade than they do in these stems. So for instance the root vocalism *a* is never further reduced between obstruents, and in these forms it may be assumed that PIE *$_e$ was restored to full grade between obstruents, as usual: the forms are *tákṣan-* 'carpenter', *śakán-* 'ordure', *dadhán-* 'curds', and *cákṣan-* 'eye'. So also full grade is restored after an initial resonant or laryngeal, since these consonants were not interconsonantal, and so could not become syllabic: the forms are *yakán-* 'liver' (rather than **ikán-*: see §1.9), *mahan-* 'greatness', *majján-* 'marrow', *asthán-* 'bone' (cf. Hitt. *ḫa-aš-ta-i* 'skeleton'), and probably *yávan-* 'light half of the month' (etymology unknown); and likewise there is restoration of full grade in *áhan-* 'day', *asán-* 'blood', and *akṣán-* 'eye', regardless of whether their etyma began with laryngeals. Two other roots show no ablaut grade weaker than lengthened grade in Indic, *rāj-* (in *rā́jan-* 'king') and *ās-* (*āsán-* 'mouth'): both *n*-stems are apparently based on the corresponding root-stems (which are attested in Sanskrit), and possibly arose in Indo-Iranian itself, since neither is attested in any other branch. The stems *pánthan-* 'path' and *manthan-* 'whirling stick for fire' are analogical according to Wackernagel and Debrunner (also demonstrated above, §2.2). The stem *áśan-* 'stone' is attested only in the weak cases in the Vedas (instr. sg. *áśnā*, gen. *áśnaḥ*), and so these forms most likely reflect instr. **áśmnā* and gen. **áśmnas* to *áśman-* (as discussed below, §3.2.2): cf., for instance, instr. sg. *mahinā́* beside *mahimnā́*, to *mahiman-* 'greatness'. This leaves just three Vedic stems in PIE **-en-* with undeniable full-grade roots, *gámbhan-* 'depth', *doṣán-* 'forearm', and *yóṣan-* 'maiden'. But all three of these stems are found only in Indic, and so may be dialectal innovations. In the first two instances there are related Indic stems of other classes on which the *n*-stems may be based, *gámbha-*, *gambhára-*, and *dó-*; and *yóṣan-* is one of the two feminine stems in *-an-* in Indic, and so is almost certainly a late creation, since this class is assumed to have comprised only masculines and neuters in Proto-Indo-European.

Under the analysis offered here it should be expected that word-initial resonants in stems in PIE **-en-* should not normally be syllabic, and yet there are six such stems in Indic. In fact, however, these six seem to have lost initial laryngeals. Naturally it is difficult to prove or disprove the existence of root-initial laryngeals in specific forms, since their traces are considerably fewer and less reliable than traces of laryngeals in other positions. Still, there is evidence in two cases. The stem *ŕ̥bhv-an-* 'dextrous' (cf. *r̥bhú-* 'skilful') is related to *rábhate* 'grasps', which shows lengthened reduplication in the perfect. The stem *udán-* 'water' is related to *uṇátti* (3. pl. *undáti*) 'wets, moistens', and as Beekes (1969:67) remarks, the structure of verbal roots with nasal infix leads one to expect two consonants before the infix. For the other four stems there is no remarkable evidence for or against an initial laryngeal: they are *ukṣán-* 'bull', *r̥ṣa-bhá-* 'bull' (cf. Hom. ἄρσην 'male'), *ū́dhan-* 'udder' (cf. Gk. οὖθαρ, οὖθατος 'udder' < **-n̥-t-os*), and *úraṇ-a-* 'lamb, ram'. The last probably requires no initial laryngeal for explanation, but reflects **vuran-* (Pokorny 1959:1.1170), from **wr̥ren-*, with antevocalic syllabic *r̥* by Sievers' law.

Under syncope it should be expected that biconsonantal roots may appear in zero grade when suffixed with PIE **-en-*, and that is true of those that end in resonants, *śván-* 'dog', *jmán-* 'path', and *ví-bhvan-* 'far-reaching'. However, biconsonantal roots ending in obstruents do not take zero grade under these circumstances: cf. *yakán-* 'liver', *śakán-* 'ordure', *aśán-* 'blood', and *áhan-* 'day'. The reason seems to be that the former type is capable of samprasāraṇa: *śván-* has the weak stem *śun-*, though uncompounded *jmán-* is not attested in any weak case in the Vedas, except the locative, originally a strong case (§2.4); and, as usual, the compounds do not show weakening of the stem in the weakest cases. On the other hand, while a weak case-form such as gen. sg. *śaknáḥ* might directly reflect the results of syncope (**k̂ek^{w}nós* < **k̂$_e$k^{w}nós*), the strong case-form nom. sg. **k̂k^{w}ens* would have been rather anomalous and phonetically difficult. And so it is not surprising that each of these four stems in *-an-* with a biconsonantal root ending in an obstruent is a *r/n*-stem, adopting innovative case-forms in *-r-* in the strong cases, e.g. nom. sg. *yákr̥t*, *ásr̥j* (also *ásr̥t*), and *śákr̥t* : Gk. ἧπαρ 'liver' (gen. -ατος < **-n̥-tos*), ἔαρ 'blood', and κόπρος 'ordure'. Cf. Kuryłowicz (1964:105–6), who also recognizes that root structure is relevant to the origin of these heteroclitic stems, though he assumes that the forms in *-n-* are innovations. But the root accent of the forms in *-r-* is peculiar (there ought not to be any alternation in the place of the accent in polysyllabic stems in Indic), and is perhaps best explained if it is assumed these forms are artificial creations with accent in imitation of the strong cases of root-stems. This explanation will not account for all heteroclitic stems, e.g. *ū́dhan-* 'udder' and Gk. ὕδωρ, -ατος 'water'; but it is necessary anyway to assume some difference of construction for forms like these latter ones, since the *-r-* suffix is not in weak grade (nom. *ū́dhar*).

3.2.2. *Stems in *-men- and *-wen-*. The stems in **-men-* are agent nouns (masculine) and verbal abstracts (masculine or neuter). In both Greek and Sanskrit the neuters almost invariably have root accent (one exception: *vidmán-* 'wisdom', which is certainly archaic), almost invariably with full grade in the root, and so apparently the place of the accent is original. On the other hand, the masculines may be accented either on the root or the **-men-* suffix. The regular ablaut difference between stems in **-men-* and those in **-en-* can be explained if it is assumed, as suggested above (§3.1), that **na* was a tonic clitic in Pre-Indo-European, while the element *_ma_, to which it was added to form *_mana_, was not. Thus stems in PIE *-_en_- have weak-grade roots, due to polytony, while stems in PIE *-_men_- may have full-grade roots, since Pre-IE *_mana_, being non-enclitic, was still a separate word, or was separated by open juncture, at the time that the rule of polytony applied. Stems in *-_men_- with weak-grade roots apparently accented the final vowel of the root-word before apocope in Pre-Indo-European, and so later lost that accent due to homorotony.

The evidence regarding the original ablaut alternations of the suffix *-_men_- is inconsistent. In Greek neuter stems the suffix is consistently in the weak grade, while it is never so in the masculine stems. In Gothic the suffix is never in reduced grade, though zero grade is reflected in the plural of neuter _namo_ 'name', e.g. gen. pl. _namne_. Armenian also provides evidence for zero-grade forms (see Godel 1975:97–9). A distributional peculiarity of the vocalism of the neuter stems is that when the suffix appears in the reduced grade it always takes the form *-_mn̥_-, never *-_m̥n_- (though the latter is found in Gothic _ja_- and _jō_-stem derivatives of stems in *-_men_-, such as _witubni_ 'knowledge' and _wundufni_ 'wound', where -_ubn_- and -_ufn_- reflect *-_m̥n_-; cf. *-_mn̥_- in _lauhmuni_ 'lightning', but *-_m̥n_- in ME _levene_, Mod. _levin_). This peculiarity suggests that *-_mn̥_- is a post-syncopic innovation (since *-_C-m_$_e$_n-V_- ought to give *-_C-m̥n-V_-, instead), and corroboration for that assumption will be offered below.

If in fact *-_mn̥_- is a post-syncopic innovation, then the *-_men_- suffix originally showed quantitative ablaut alternations between full and zero grade (with lengthened grade arising later), but no reduced grade. The Vedic evidence supports this analysis. The declension of Vedic stems in -_man_- differs in several ways from the pattern seen in other languages, and shows some apparently archaic features. One peculiarity of Vedic declension is that among both the masculine and the neuter stems, according to the standard handbooks, in the weak cases the suffix takes the form -_man_- after roots ending in a consonant (e.g. instr. sg. _áśmanā_ 'stone'), while after a root ending in a vowel the suffix may be either -_man_- or -_mn_-, often in free variation, e.g. instr. sg. _bhūmánā_ beside dat. sg. _bhūmné_ 'abundance'. The form -_man_-, however, never appears after a short vowel, e.g. instr. sg. _aryamnā́_ 'comrade', *mahimnā́*, *varimṇā́* 'expanse', never ***aryamánā*, etc. (Forms with a short vowel before the suffix are actually quite rare, and involve post-syncopic developments, as demonstrated below.) For masculine stems there is a regular accentual difference associated with this ablaut difference: weak cases with *-man-* always have the accent of the strong cases, whether it falls on the root or the suffix, while weak cases with *-mn-* always have accented desinence. Accounting for this accentual difference reveals a great deal about the prehistory of the stems in *-man-*. The type with accented desinence is clearly archaic: this is where the accent should have fallen in Proto-Indo-European, and at any rate desinential accent is not likely to be due to an innovation, since the accent falls on the stem in the strong cases, and so such an innovation would represent a pointless complication rather than a simplification of the paradigm. The accent of the type with *-man-* in the weak cases then appears to be analogical, since it is always that of the strong cases. The most economical way of accounting for the Vedic accent is to assume that it originally fell consistently on the desinence in the weak cases, but that subsequently it shifted, wherever it could, to the vowel that carried the accent in the strong stem, in accordance with the principle that polysyllabic stems in Indic have columnar accent. It did not shift in masculine stems with *-mn-* because in Vedic, at any rate, almost all masculine stems in *-man-* are accented on this suffix in the strong cases, and so the accent had no vowel in this suffix to shift to in the weak cases. The accent did shift, however, in neuter stems with *-mn-*, because Vedic neuters of this class are almost invariably accented on the root. And so the place of the accent in the Vedic weak cases depends on the ablaut grade of the suffix, rather than vice versa. What then accounts for the variation in that ablaut grade? Certainly it is somehow due to the weight of the preceding syllable. It should be assumed either that originally there was always a vocoid between the *m* and the *n*, and it was syncopated when a vowel preceded the suffix (as assumed, for instance, by MacDonell 1910; this syncope would of course be separate from and quite later than the syncope that is the subject of this book), or the suffix originally was always *-mn-*, and a vocoid was epenthesized when the suffix was preceded by a consonant. There are several reasons to choose the latter alternative. It is difficult to justify positing a syncope rule that applies only to the *n*-stems, while the domain of application of an epenthesis rule may be easily restricted to the environment of triconsonantal clusters, since this environment is of limited occurrence. In fact, such an epenthesis rule is already assumed for Indo-European—it is Sievers' law. That at any rate explains why the *n* of the suffix may be syllabic, while the *m* may not. It also accounts for the free variation between **-mn̥-* and **-mn-* in forms like instr. sg. *bhūmánā* and dat. sg. *bhūmné*, since the application of Sievers' law is quite irregular (it ought not actually to be called a law anymore), as illustrated above in the discussion of Seebold's Anschlussregel and the *ī*-stems (§§1.3,1.9). And it accounts for the fact that the suffix is *-mn-*, never *-man-* < **-mn̥-*, when it follows a short vowel in Vedic. Another reason to suppose the vocalism of the suffix in the Vedic weak cases is due to epenthesis rather than syncope is that some archaic forms point to a zero-grade suffix. So for instance Av. *raoxšna-* 'shining', Lat. *lūna* 'moon', and Pruss. *lauxnos* all reflect thematized forms of a stem **leuksmn-* (cf. Lat. *lūmen* 'light'); and Skt. *budhná-*, OE *botm*, and, with metathesis, Gk. πύνδαξ and Lat. *fundus* 'bottom', reflect **bhudhmn-*: cf. Gk. πυθμήν 'bottom'.

If the reduced-grade form of the suffix **-mn̥-* is due to Sievers' law, then it follows that originally the suffix always took the nonsyllabic zero-grade form **-mn-* in the weak cases, and that is what the theory of iterative syncope predicts. For example, Pre-IE instr. sg. **Hák̂a+maná-H(a)* is syncopated to **Háḱ+mnáH*, giving PIE **Hek̂mnéH*. With the Indic accent shift this is reflected directly in Vedic *áśnā* (with simplification of the consonant cluster), while the same PIE form when affected by Sievers' law gives the commoner Vedic form *áśmanā*. The apparently facultative nature of the application of Sievers' law may perhaps be attributed to paradigm regularization whereby *m* was restored in the weak cases by analogy to the strong, and thus arose **Hek̂néH* and **Hek̂mnéH* > **Hekmn̥néH* side by side in the instrumental case. Such paradigm regularization of consonantism is especially clear in the stems in **-wen-*, where Vedic has, for instance, instr. sg. *grā́vnā* 'pressing stone' rather than **grāúṇā* or, more likely, **gróṇā* with dissyllabic *o* < PIE **-eHu-*. Rather, *-āv-* has been leveled into the weak cases from the strong, e.g. acc. sg. *grā́vāṇam*. This also explains why forms like Av. *raoxšna-* and Skt. *budhná-*, above, show loss rather than vocalization of **-m-*: there was no paradigmatic alternation between **-mn-* and **-men-* in such forms, and thus no model for the restoration of **-m-*, as there was in *áś(ma)nā*.

Stems in **-meṇ-* with a short vowel before the suffix, which are few, necessarily result from post-syncopic developments, since the final vowel of the Pre-IE root-word ought always to have been eliminated, either by syncope or homorotony. Most of the relevant forms show post-syncopic vocalization of an interconsonantal laryngeal, e.g. Vedic instr. sg. *mahimnā́* 'greatness', *varimṇā́* 'width', and Gk. τελαμών 'supporting strap' (cf. fut. τλήσομαι 'bear up, endure'). (Vocalization of an interconsonantal laryngeal is also attested in Skt. *duhitár-*, Gk. θυγάτηρ 'daughter', §3.3.1.)[2] Greek shows some instances of thematization of the root under Sievers' law conditions, e.g. κηδεμόν- 'protector', ἡγεμόν- 'leader', and ἀκρεμόν- 'twig'; but Indic shows no trace of this epenthesis. Vedic *aryamáṇ-* 'comrade' (=Av. *airyaman*) is an Indo-Iranian coinage. The one truly puzzling exception is Gk. ὄνομα, Lat. *nōmen*, etc. 'name'. The etymology of this word is unknown—see, e.g., Cowgill (1965:156) and Beekes (1969:229–30); for other references see Bammesberger (1984:140–1). Perhaps the word is a post-syncopic formation based on the pronominal stem **(e)no-*, **ono-* (Pokorny 1959:1.319–21) found in Gk. (ἐ)κεῖνος 'that' (<*κε ἐνος), Skt. masc.-neut. instr. sg. *anéna* 'this, that', Gothic *anþar* 'other', etc.—thus the concept 'name' in Proto-Indo-European represents 'thisness'. Because (as Cowgill argues) an initial laryngeal seems unlikely, this word must have some such unusual history, since **no-* does not have anything like normal PIE root structure.

3.3. THE *R*-STEMS. There are three types of nouns belonging to the class of *r*-stems: 1) nouns denoting familial relationships, as OHG *muoter* 'mother', *zeichur* 'brother-in-law', etc.; 2) agentive nouns from verbal roots, e.g. Lat. *stator* 'attendant', and *pōtor* 'drinker'; and 3) a few others of no clearly-defined semantic type, primarily Arm. *astł* 'star', Av. *nar-* 'man', and Skt. *usŕ̥-* 'dawn'. The three groups will be examined here in turn.

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[2] Admittedly, the spontaneous vocalization of interconsonantal laryngeals is typologically suspect, given Bell's findings about the syllabicity of syllabic consonants (§1.5). Yet I still find this the most plausible explanation, especially since it is *only* laryngeals and no other consonants that are thus affected.

3.3.1. *The r-stem kinship terms.* Skt. *duhitár-* and Gk. θυγάτηρ 'daughter' both reflect PIE **dhugH̥ter-*, assuming the laryngeal caused aspiration of **g* in Indo-Iranian, as first suggested by Kuryłowicz (1935:53). This assumption is corroborated by the Avestan cognate, GAv. *dugədar-*, YAv. *duγδar-*: PIE **H̥* is consistently lost in Avestan internal syllables (see Insler 1971), and then a voiced aspirate is required in order for Bartholomae's law to apply correctly—i.e., **-ght-* > Pre-Av. **-gdh-*. However, the syllabic laryngeal is not reflected in any other language: cf. Gothic *dauhtar*, Lith. *duktė̃*, OPr. *duckti*, etc. This apparent loss of **H̥* is explained under the analysis of complex stems proposed above (§3.1), where it was suggested that this word is composed of Pre-IE non-enclitic **tara* added to a root-word with an accented final vowel, **dhawàgaHá*. Under the principle of homorotony the primary accent of the root-word was lost, and so after syncope there was an alternation between strong **dhw*$_e$*gHter-* and weak *dhw*$_e$*gHtr-*. (Presumably homorotony applied on an iterative basis in the latter form, e.g. dat. sg. **dḥawàgaHá+tárá-y(a)* > **dhawàgaH̄a+tará-y*. Note also that the secondary stress rule is assumed here and throughout to have applied before the law of homorotony.) The laryngeal was thus consistently nonsyllabic, just as it was originally before the non-enclitic suffix in the etyma of Vedic instr. sg. *mahimnā́* 'greatness' *varimṇā́* 'width', and Gk. τελαμών 'supporting strap', and was similarly vocalized in Greek and Indo-Iranian, as argued above (§3.2.2). It is usually assumed instead that **H̥* has been syncopated in the reflexes of **dhugH̥ter-* in all other IE branches. But it is difficult to explain why a medial vowel should have been lost in some of these languages, while loss of consonantal **H* is normal.[3]

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[3] The possibility thus arises that the regular loss of medial schwa in Germanic (see Bennett 1978) and Balto-Slavic (see Brugmann 1897–1916:

Since **dhugHter-* is of a kind with the PIE word for 'father', the latter might be expected to show zero grade of the root, i.e. strong **pHter-* and weak **pHtr-*. This is because of homorotony: Pre-IE **pallá tára sa* yields pre-syncopic **palla+ tára-s*. Kuiper (1942:21–5) does in fact argue that the laryngeal was nonsyllabic in the weak cases, and this position has gained a certain amount of credence: see Hoenigswald (1965:99 n. 24) and Beekes (1969:8). But the details of Kuiper's analysis suggest some difficulties. His most important fundamental assumption is that initial *f* in the paradigm of the Avestan reflex of this word must derive from an Indo-Iranian voiceless aspirate that was aspirated by the laryngeal, and that this aspiration can only have taken place if the laryngeal was nonsyllabic. Thus he assumes that the laryngeal was syllabic in the strong cases (e.g. acc. sg. **pH̥térm* > Av. *pitarəm*), but nonsyllabic in the weak—e.g. dat. sg. **pHtréi* > **phtrai* > **ftrai* > **fθrai* > **fδrai* > *fəδrōi*. This hypothesis is designed to explain not only the initial *f* in some of the Avestan weak cases, but also the irregular appearance of *i* < **H̥* in the paradigm. However, the hypothesis does not accomplish this latter end. Under Kuiper's analysis Av. *i* should be expected to appear in the strong cases and not the weak; but in fact no strong case of the Gathic Avestan word has *i*, while one weak case does. The forms are listed in Table 3.3.1. Likewise there are several instances in Younger Avestan of *i* lost from the strong cases, while it is found in the weak dative singular. Kuiper acknowledges most of these exceptions, and attributes them variously to analogy, dialectal borrowing, and defective notation, but as it turns out, the exceptions

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1.1.177–8; and Watkins 1965:117–8) may consistently be explained as loss of a consonantal laryngeal. The change of Proto-Balto-Slavic **-eRHC-* to **-ēRC-* in particular makes better phonological sense if **H* in this sequence was nonsyllabic: the loss of a syllabic laryngeal here when two syllables were reduced to one, without loss of an intervening consonant, is perhaps a less natural assumption than lengthening of the vowel upon loss of a consonantal laryngeal, which lengthening may be attributed to preservation of syllable quantity. This of course is not the first time it has been suggested that the laryngeal in such forms was nonsyllabic in Proto-Indo-European: see, for example, Pinault (1981), and on the typological problem involved, see note 2 to this chapter.

are in fact as numerous as the forms predicted correctly. In short, given the coöccurrence of forms with and without *i* in apparently free variation, it seems unlikely that the appearance of *i* in this paradigm can be predicted on the basis of PIE conditions. And of course it also is not clear why */H/ should have been syllabic in the strong cases and not in the weak, considering this is not an alternation with any known parallel in Proto-Indo-European. Insler (1971:573 n. 2), who assumes that *_H_ was syllabic throughout the paradigm in Proto-Indo-European, suggests that it was retained wherever its loss would result in a monosyllabic form, and exceptions in the paradigm are due to analogy. But the exceptions seem rather many. Perhaps rather the appearance of *i* was originally conditioned by external sandhi—originally it appeared only when the initial *p* was not preceded by a vowel. The evidence of the Gathas tends to support this analysis, since, with few exceptions, forms of *pitar-* that appear after a word ending in a consonant, or at the beginning of a line of verse, have *i* in the root, while forms that appear after a word ending in a vowel have either *a* or no vowel in the root. In these latter instances the *a* is epenthetic, having been inserted sometime after the loss of *i*: this is demonstrated by spelling variants in the manuscripts (e.g. *ptā* beside *patā*, Yasna 45.11), as well as by the meter (e.g., in regard to the same example,

		GAv.	YAv.
sg.	nom.	*ptā, tā, patā*	*pita, pitō, ptā, pata*
	acc.	*patarə̄m*	*pitarəm*
	dat.	*fəδrōi, piθrē*	*piθre*
du.	acc.		*pitarə*
pl.	nom.		*patarō*
	acc.		*fəδrō*
	dat.		*ptərəbyō*

Table 3.3.1. The attested forms of Avestan *pitar-* 'father'.

patā must be scanned as one syllable in order to make a seven-syllable *b*-verse, the usual number in Yasna 45). And so dat. sg. *piθrē* appears at the end of a verse, after the word *puθrəm* (Y. 44.7), while the other dative form *fəδrōi* appears after a word ending in a vowel, *yā* (Y. 53.4); likewise although the nominative singular is attested four times in the Gathas, *i* is consistently missing, and the word consistently appears in the middle of a line, after a word ending in a vowel. There is one exceptional case-form: acc. sg. *patarə̄m* is attested twice in the Gathas, once in the middle of a line after *vaŋhə̄uš* (Y. 31.8), and once at the beginning of a line, where the preceding line ends with the word *dāt̰* (Y. 45.4); and in both instances the meter confirms that *pat-* stands for *pt-*. The former instance is perhaps explicable because the word-final consonant is *š*, which is unlikely to have had much of an effect on the syllabication of the following consonant group.

The Younger Avestan evidence also tends to support this analysis, since it involves just three exceptions among fourteen attestations (Yasht 10.117; Yasna 11.4; and Vīdēvdāt 12.1), in addition to one exception in a fragmentary Pahlavi version of Vīdēvdāt 7.72 (see Bartholomae 1961:905).

That the laryngeal should originally have been vocalized only when the word was not preceded by a vowel in external sandhi is an assumption that accords with the argument advanced above (§2.2) that root-stems originally showed similar epenthesis of a vocoid in the weak cases, but not in compounds that placed a vowel before the root, e.g. gen. sg. *pdos > *p$_e$dos 'foot', but Av. *fra-bda* 'forefoot', Skt. *upa-bdá-* 'din', etc. Further evidence that the root of the PIE word for 'father' was in fact reduced to zero grade, and that the laryngeal was only later vocalized, is afforded by the accusative plural of the word in Avestan, a form examined below (§3.3.4).

The usual Neogrammarian explanation for the consonantism of the Avestan word is that the stem *fəδr-* reflects *ptr- (see Bartholomae 1895:223 n. 2 to §400; and Brugmann 1897–1916:1.2.645), and this explanation makes fine phonological sense in view of other phonological developments in Avestan (assuming loss of *H in Avestan whenever it was not vocalized). The initial cluster *ptr-, it should be remembered, arose only when preceded by a vowel. The usual development of PIE **-tr-* in Avestan is to *-θr-*, e.g. in *puθrō* 'son' (=Skt. *putráḥ*). It may be assumed that in the resulting **pθr-* the *p* was aspirated (and then spirantized) by contact with θ, just as *k* was aspirated for the same reason in *vaxəδra-* n. 'saying' (cf. Skt. *vaktra-* n. 'mouth'). The change of **fθr-* to **fδr-* is also paralleled in *vaxəδra-*, and is due to voicing dissimilation of continuants (Bartholomae 1895:165). And finally normal Avestan anaptyxis yields the weak stem *fəδr-*. This analysis offers several advantages over the explanation of the aspiration by means of the laryngeal. Perhaps most important, it is now no longer necessary to regard either *fəδrōi* (Kuryłowicz 1935:67) or *piθrē* (Kuiper 1942:182) in the dative singular as analogical. Both are etymological reflexes, the only difference being that one shows loss of PIE **H*, with the attendant changes in consonantism, while the other (the non-postvocalic form) retains **H̥*. And so now it is possible to see that initial *f-* and the retention of **H̥* are actually in complementary distribution in the weakest cases. In the strong and middle cases the loss of **H* entails no changes of consonantism, because those changes are all initiated by the change of **t* to θ—a change that could not take place in the strong and middle cases, since *t* there never appeared before nonsyllabic *r*. This analysis also prevents any violation of the belief held by most laryngealists that the laryngeal reflected in this word is not one that ought to have aspirated a voiceless stop in Indo-Iranian (assuming the root is the same one reflected in Hittite *pa-aḫ-ḫa-aš-mi* 'protect'). At any rate it is an advantage that this explanation does not require the assumption that Indic has leveled the nonaspirated variant from the strong cases throughout the paradigm of *pitár-*, given that in similar instances it seems always to have been the aspirated variant that was generalized, as in *pánthāḥ* and *duhitā́*, and the stems of verbs of the ninth class, such as *mathnā́ti*, 'shakes', *grathnā́ti* 'ties', *śrathnīté* 'slackens', etc. Finally this explanation is preferable because the rules employed in this analysis must be posited for Avestan, anyway, to account for forms like *puθrō* and *vaxəδra-*, and more particularly forms like acc. pl. *nafəδrō* in the paradigm of YAv. *naptar-* 'descendant', where precisely the same changes have occurred without the presence of a laryngeal (cf. Skt. *náptar-* 'descendant', Lat. *neptis* 'granddaughter'). Therefore the laryngeal explanation requires rules that are a needless complication of the grammar, the rules of which are already sufficient to account for the consonant alternations.

The etymon of Latin *frāter* 'brother' was examined above (§3.1), and *māter* 'mother' is of the same type. Somewhat different is PIE **dH̥ywer-* (or **dHeywer-*) 'husband's brother', which is difficult to classify. It may reflect either Pre-IE **daHaya-wa-* plus tonic clitic **ra*, or Pre-IE **dàHayá* (or **daHáya*) plus non-enclitic **wára*: although PIE **-wer-* is not attested as a suffix, the *w* certainly does not belong to the root, since */dHeyw-/ does not have an admissible PIE root structure (Meillet 1937:156–7). In the former instance one might expect syncope to produce a weak stem **d*$_e$*Hy*$_e$*wro-* > **dH̥yuro-*, and in the latter instance **dH*$_e$*y+wro-* (or **dHey+wro-*), presumably developing to **dH̥ywro-*. The attested IE forms provide no reliable evidence: none of the weakest cases of Vedic *devár-* is attested, and Greek, Armenian, and Balto-Slavic all reflect **dH̥ywer-* in the weakest cases, a stem that is certainly analogical (see below). The Germanic forms appear to be based on the PIE weak stem: the evidence of OE *tācor* is debatable, but OHG *zeichur* assuredly reflects PGmc. **taikur-*, since PIE **-er-* is preserved in OHG unstressed syllables—cf. *fater* 'father', *muoter* 'mother', *bruoder* 'brother', and *tohter* 'daughter'.[4] Assumption of a PIE weak stem **dH̥yur-* perhaps also explains the velar consonant in these Germanic forms. Its source is disputed: Lidén (1897:36–7) suggests that the

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[4] The usual assumption is that PIE **-er-* is also preserved in Old English unstressed syllables, and that is probably true, e.g. in *ofer* 'over' (like Gk. ὑπέρ). But the standard handbooks also assume *fæder* 'father' shows such preservation (see Brunner 1965:32; and Campbell 1959: 138), and that seems quite unlikely in view of *mōdor* 'mother', *brōðor* 'brother', and *dohtor* 'daughter'. Rather, the principle governing the quality of the unstressed vowel here appears to be the vowel harmony that affects vowels arising from the Old English vocalization of final resonants (see Brunner 1965:129; and Campbell 1959:151), such that the unstressed vowel is *e* (or *i*) after a front vowel, and *o* (or *u*) after a back vowel, e.g. in *fugol* 'bird' < Pre-OE **fugl-*, but *æcer* 'field' < **æcr-*. In that event it must be assumed that the Old English kinship terms reflect the PIE weak stems in **-tr-* (or, considerably less likely, stems in PIE **-tor-*), leveled throughout the Pre-OE paradigm. This explanation

intrusive consonant has been taken over from some lost Germanic cognate of Lith. *laigõnas* 'wife's brother' (accepted by Georgiev 1980:200–1; rejected by Seebold 1982:174–5, with bibliographical discussion); and Austin (1946, 1958; cf. Lehmann 1952:50–1) argues for a laryngeal origin. The former explanation is not impossible, but while it provides a source for the change, it does not provide a motivation, and that weakness combined with the nonattestation of any Germanic cognate to the Baltic word makes the suggestion seem rather conjectural. The latter explanation is unlikely because the laryngeal is in the wrong place in the etymon. Assumption of a PIE alternation **dḪ̥ywer-/*dḪ̥yur-* provides a motive for the insertion of a non-etymological consonant into the stem in Proto-Germanic: at that time the PIE biphonemic sequence **ay* before a consonant became a monophonematic diphthongal unit, and so to prevent such an anomalous alternation as PGmc. **tai.wer-/*ta.jur-* (where the point marks the syllable boundary, and *ai* is a single segment), a consonant was inserted into the weak stem, thereby regularizing the first syllable. Avoidance of the same extreme alternation also explains why the strong stem was leveled into the weak cases in the cognate languages, since anteconsonantal **ai* < PIE **Ḫ̥y* in these languages also became a monophonematic unit. The paradigm regularization is especially evident in Homeric Greek, since here the difference between the strong and weak stems of *r*-stem nouns is otherwise preserved rather well. That the Homeric weak stem of δᾱήρ (<*δαιϝήρ) is not original is suggested by the fact that the Homeric weak cases of these *r*-stem kinship terms consistently show zero grade in the stem-forming suffix (e.g. gen. pl.

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accounts for the difficult form gen. sg. *wuldurfadur* in *Cædmon's Hymn*, for expected **wuldurfæder*: Gmc. **a* in the second elements of Old English compounds may appear as *a* rather than *æ* (Campbell 1959:141), and thus Pre-OE **r* was vocalized as *ur* rather than *er* in *-fadur* Thus it is unnecessary to resort to Bammesberger's (1983) explanation of *-ur* in this form as analogical to the dative plural (PIE **-r̥-mis*), or to Hoffmann's (1976:597) comparison to the Sanskrit ending *-ur* (as in gen. sg. *pitúr* 'father'). And so OE *tacor* does after all provide some evidence that the PIE weak stem was not **dḪ̥ywer-*, despite the Greek, Armenian, and Balto-Slavic evidence, since PIE **-er-* should then have been preserved in this word.

πατρῶν, cf. analogical Attic πατέρων), except that the Homeric genitive plural of δᾱήρ is δαέρων (the only weak case attested). And so the original genitive plural may well have been *δαυρῶν (<*δαι̯υρῶν < **dH̥yuroHm*), and this at any rate is probably the best explanation why δαέρων must be scanned as a spondee at the two places where it occurs in Homer, given that it replaces *δαυρῶν. I have seen no other explanation for this scansion.

PIE **swesor-* 'sister' remains intractable, and cannot be explained as the product of syncope, since two full-grade vowels cannot be separated by a single consonant except as the result of analogical developments. That the origin of **swesor-* really is different from that of other *r*-stem kinship terms is suggested by the fact that the latter always have **-er-* rather than **-or-* in the strong cases—cf. Vedic acc. sg. *svásāram* and Gk. ἔορες· προσήκοντες, συγγενεῖς (Hesychius; also ἔορ· θυγάτηρ, ἀνεψιός). All the commonest etymological speculations about this word lend themselves readily to the assumption that it is a fairly late creation. The most popular view is that it represents the reflexive pronominal stem **swe-* (as in Skt. poss. *svá-*, Gk. pron. ἕ, and Gothic poss. *swes*, also contained in PIE **swekrū́-* 'husband's mother' and **swékuro-* 'husband's father') and **sor-*, meaning 'woman' or 'wife', if this element can be abstracted from Latin *uxor* 'wife', and from the feminine forms of PIE 'three' and 'four', as in Skt. *ti-sráḥ* and OIr. *téoir* (<**tisores*), and perhaps some other forms. Such a construction could not be very archaic, since it is not properly a compilation of root and suffix—i.e., it is not composed of elements that ceased to be independent words in Pre-Indo-European, like **-ter-*, but of elements that remained separate words into the PIE period. The same may be said of Pisani's contention (1951:7; 1954:241; and see Mayrhofer 1952) that the word derives from **su-* '(one's) own' plus **esōr* 'blood', and Szemerényi's suggestion (1964:335; 1965:221; see also Normier 1980:48–59) that the word is composed of **swe-* 'kin' plus **sū-* 'woman, mother'.

3.3.2. *Deverbatives in *-ter-*. Rather different from the kinship terms are the agent nouns in **-ter-*, since this is a productive class, with many dialectal innovations. The accent of the Sanskrit forms is of no value for locating the PIE accent, since in Indic the accent has consistently been moved to the stem-forming suffix in order to distinguish these words from the otherwise identical gerundives in *-tar-*, which are accented on the root—a distinction carefully maintained in the Vedas. Moreover, almost without exception among its more than 150 stems of this type, Vedic consistently has full-grade vocalism of the root. In other IE languages, the root may have either full or reduced grade, e.g. **k̂enstor-* in Skt. *śaṁstár-* 'reciter', but **k̂n̥ster-* in Osc. *keenzstur*; **bhertor-* in Skt. *bhartár-* 'bearer', but **-bhr̥tor-* in Av. *a-bhərətar-* 'collector'; and **dheHtor-* in Skt. *dhātár-* 'creator', but **dhH̥tor-*, *-er-* in Lat. *con-ditor* 'founder', Gk. θετήρ 'man of action'; full grade, on the other hand, in Lat. *pōtor* 'drinker' = Skt. *pātár-*; Lat. *nōtor* 'expert' = Skt. *jñātár-* 'one who knows'; and Lat. *domitor* 'tamer' = Skt. *damitár-* (cf. Gk. δμητήρ < **dm̥̄tēr*). The place of the Greek accent corresponds to the quality of the vocalism in the suffix, e.g. ληϊστήρ, ληΐστωρ 'plunderer', γενετήρ, γενέτωρ 'sire', etc. But the Greek accent has nothing to do with the quantitative ablaut grade of the root. Rather, that apparently is always in agreement with the ablaut grade in the singular of the original present stem of the verb on which the agent noun is based—though the present stem itself is not used, as demonstrated by reduplicated presents. Homeric examples are ἀρητήρ 'priest(ess)', to ἀράομαι 'pray' (<*ἀρϝάομαι < **[ₑ]rwéH-o-* [with prothesis; cf. Skt. *ruváti* 'cries aloud']), fut. ἀρήσομαι; ἀμητήρ 'reaper', to ἀμάω 'reap' (<**[ₑ]HmeH-o-*), fut. ἀμήσω; ἀρνευτήρ 'tumbler', to ἀρνεύω 'tumble'; ληΐστωρ, to ληΐζομαι 'plunder'; ἀροτήρ 'ploughman', to ἀρόω 'plough', fut. ἀρόσω; ἐλατήρ 'charioteer', to ἐλάω, ἐλαύνω (<*ἐλα-νϝ-ω?) 'drive', fut. ἐλάσω; ὀλετήρ 'destroyer', to *ὀλέω (>ὀλέκω?), ὄλλῡμι 'destroy', fut. ὀλέσω, etc.

In Latin also there is a general correspondence between the ablaut grade of the present-tense verb stem and the derivative noun, e.g. *actor* (*agō* 'drive, do'), *domitor* (*domō* 'tame' : Gk. δμητήρ < **dm̥̄-*), *junctor* (*jungō* 'join' : Gk. ζευκτήρ, to ζεύγνῡμι), *stator* (*stō* 'stand' < **stə-ō*), *genitor* (*genō* 'beget'), etc.

In sum, then, neither the Indic accent nor ablaut grade of these agentive nouns can be original, while the combined evidence of Greek and Latin suggests the **-ter-* suffix was simply added to a form of the stem with the ablaut grade of the present-tense verb stem. This may have been the original method of forming such nouns, but the fact that Sanskrit follows a different system suggests at least that the original pattern was not firmly established in Proto-Indo-European, and it should be concluded that most agent nouns in _*-ter-_ are dialectal innovations. A few undeniably archaic forms are identifiable, e.g. Gk. δοτήρ beside δωτήρ and δώτωρ 'giver', where the coexistence of weak and full grades is perhaps due to the alternation between full and weak grade in the athematic present stem (assuming the original method of forming these nouns was something like the Greek and Latin method). At any rate, if the original method was to add _*-ter-_ to the present-tense verb stem, the method almost certainly was established after the period of syncope, and so only the most archaic forms may be supposed to have undergone syncope in the usual manner.

3.3.3. _Miscellanea._ There are a few _r_-stem nouns that seem to belong neither to the category of kinship terms nor to deverbatives, and so the significance of the _r_-suffix in this small group is unknown. An original alternation is preserved in Gk. ἀνήρ 'man', gen. ἀνδρός < *ἀνρός. Outside of the nominative and vocative singular the stem is ἀνδρ-, but in poetic usage it is often ἀνερ-, and it may be assumed that originally the strong stem was ἀνερ- and the weak *ἀνρ-. Arm. _ayr_ (<_*anḗr_), gen. _aṙn_ (<_*arn-_ < _*anr-_) corresponds precisely to the Greek word, and together these cognates suggest an initial laryngeal, lost in Skt. _nár-_, Av. _nar-_, Alb. _njer-_, etc. The laryngeal is confirmed by the lengthening in the Vedic compounds _sū-nára-_ 'delightful; young son', _sū-nŕ̥ta-_ 'grandness', and _sū-nr̥tā́vat-_, _sū-nr̥tā́van-_ 'grand' (cf. OIr. _sonirt_ 'strong' for the meaning). And so may be reconstructed PIE nom. sg. _*Hnḗr_ (<_*Hnérs_), acc. _*Hnérm_, gen. _*Hn̥rós_ (<_*H_$_e$_nrós_, with the regular development of _*n̥_ before sonorants, §1.6), etc. The initial vowel of the Greek and Armenian forms then is due not to prothesis, but to leveling within the paradigm: in Greek and Armenian, _an-_ from the weak cases was leveled into the strong, while in the other IE branches there was leveling in the opposite direction. The motivation is the same in both instances: leveling normalized the root.

Very like *Hnḗr is the PIE word for ‘star’, Vedic *tā́r-* (only in nom. pl. *tā́raḥ* and instr. pl. *stŕ̥bhiḥ*), Av. *stār-*, Arm. *astł*, Gk. ἀστήρ, -έρος, Corn. *sterenn*, Goth. *stairno*, etc. The Greek and Armenian words suggest an initial laryngeal; and in fact one might expect an initial voiced pharyngeal fricative if, as Austin suggests (1941:86), this is an early PIE borrowing from Semitic—cf. Akkadian *Ishtar*, Hebrew *‘Ashtoreth*, Phoenician *‘strt* (borrowed as Latin *Astartē*), name of a deity, personification of the planet Venus. Supposing *st was a cluster in the borrowed form (i.e., Pre-IE *Hastara-), the PIE reconstruction should be nom. sg. *Hstḗr (<*Hstérs), acc. *Hstérm, gen. *Hestrós (<*H$_e$strós). This reconstruction accounts for several peculiarities of the word. It is to be supposed that in the strong stem *s* was assimilated to *H* in some dialects, probably under specific conditions of external sandhi (see also below, §§3.4, 3.5, in regard to similar assimilations in the nominative singular of *ā-* and *ī*-stems, and the nom.-acc. plural of *s*-stems), giving *Hter-, and this accounts for the absence of *s* in Skt. *tā́raḥ*, as well as fem. *tārā́* ‘constellations’, Hom. τέρας, and acc. pl. τείρεα ‘constellations’ (apparently with metrical lengthening, since Eustathius comments on the Homeric text that a form τέρεα is used by Alcaeus; cf. also dat. pl. τείρεσιν, Hom. Hymns). In that event, initial alpha in ἀστήρ is less likely due to prothesis than to leveling from the weak stem, and the same is probably true of Arm. *astł*. That a syllable has been lost from at least some forms of Vedic *tā́r-* (i.e. the weak cases) is suggested by the accent of *stŕ̥bhiḥ*, which is not appropriate to monosyllabic stems, since these accent the desinence in the weak cases. The Avestan paradigm shows some leveling of the strong stem *stār-* into the weak cases (gen. sg. *staro*, gen. pl. *stāram̨*), and as with Indic and most IE languages, the first syllable, from *He- < *H$_e$-, has been eliminated from the weak cases, but two of the original weak case endings occur, acc. pl. *strəuš* (<*[H$_e$]str$_e$ns; cf. *nərəuš* to *nar-*) and gen. pl. YAv. *stram̨* (<*[H$_e$]stróHm; cf. *naram̨* and GAv. *strəm-ča*, with vowel-weakening before *-ča* [Bartholomae 1895:171, 223]).

Vedic *uṣár-* ‘dawn’ (gen. sg. *usráḥ*; strong stem attested only in voc. sg. *uṣar*) seems to conform well to the model of *nar-* and *tār-*, suggesting the reconstruction *H$_e$wsér-/*Hw$_e$sr-, becoming *Huser-/*Husr-. Unfortunately there is no precise morphological parallel outside of Indic to confirm this reconstruction, though some relatéd forms suggest this analysis is too simple. Gk. αὔριον 'tomorrow' is apparently a Hellenic innovation, which Frisk (1960–72:1.189–90) regards as a thematization of **awsri*, locative of a *r*-stem noun **awser-* 'morning'. (Under the analysis of the locative proposed above, §2.4, the correct locative ought to have been **awseri*; but **awsri* is a possible Pre-Greek form, given the leveling of the weak stem into the Greek dative-locative of other *r*-stems, e.g. πατρί : Skt. *pitári*.) By means of an ingenious analysis of developments in Greek sonorant clusters, Kiparsky (1967:624–6) discerns the same *r*-stem locative in the adverb ἦρι 'at early morn' and adj. ἠέριος 'at daybreak', and he contends that the *r*-stem itself is reflected as Hom. ἀήρ 'mist'. It is no doubt true that αὔριον derives from a locative form: cf. adjectives like ἐννύχιος 'nightly' (cf. νύξ 'night') and ἐνόδιος 'by the road' (cf. ὁδός 'road'). However, that the different ablaut forms of the first syllable reflected in αὔριον and Vedic *uṣár-* should derive from the same paradigm seems unlikely, in view of the uniformity of root vocalism in other *r*-stems. Perhaps then the disparity between αὔριον and *uṣár-* is tied up with the existence of various related stems, since all clearly related stems have reduced grade of the root in Indo-Iranian, while all have full grade of the root in all other IE languages (examples below). This situation suggests the influence of one paradigm on another. So for instance *s*-stems normally have full grade of the root (§3.5), with very few exceptions; yet in Vedic one finds f. *uṣā́ḥ* (=Av. *ušå*), in opposition to Hom. ἠώς (<**āwsōs* or, preferably, by Kiparsky's reasoning **awsōs*) and thematized Lat. *aurōra*. It is improbable that the two ablaut forms originally alternated in the paradigm of a *s*-stem; rather, it is more likely that in Indo-Iranian the ablaut form **us-* was leveled into this paradigm from related stems, such as the *r*-stem. Conversely, the **awsri* underlying αὔριον very likely shows leveling from **awsōs* and related forms. The motivation for this intraparadigmatic leveling is not difficult to see: it is to make transparent the relationship between the word for 'dawn' and related forms (in a different ablaut grade) whose reference is clearly to dawn. There is no need to assume, as Frisk does, that Lith. *aušrà* is also based on the *r*-stem noun; rather, it more likely is based on the thematic adjective reflected in Skt. *usrá-* 'matutinal' and its derivatives, including fem. *úsri-* 'morning; brightness' (see Brugmann 1897–1916:2.1.381–2 for the connection of *-ri-* with the adjective suffix), *usríya-* 'reddish', and f. *usrā́-* 'dawn', the last of which is identical to the Lithuanian word, except as regards the ablaut grade of the root. That *usrá-* is a genuine adjective in PIE **-ro-* and not a derivative of a *r*-stem noun is made clear by the existence of related forms bearing various of Caland's suffixes, since **-ro-* is one of Caland's suffixes (see §3.5): e.g. **-es-* in the *s*-stem forms cited above, and 'compounding' **-i-* in Av. *uši-då* 'Having Its House Near the Dawn' (name of a mountain). And so actually, assuming the adjective in **-ro-* had full grade of the root in Proto-Indo-European, the only forms outside of Indo-Iranian that require the assumption of intraparadigmatic leveling are the Greek forms based on the *r*-stem noun. Assumption of some such leveling does seem necessary in order to account for the consistency with which a single ablaut grade is encountered in all related forms in any IE branch.

PIE **wes-r-* 'spring' does not properly belong with the *r*-stems: Pokorny (1959:1.1174) reconstructs this as a heteroclitic *r/n*-stem, on the basis of a small number of forms including Skt. *vasan-tá-* m. 'spring'. Thus **wes-r-* is like Skt. *yákr̥t*, *ásr̥j*, etc. (§3.2), and even shows the same root accent, as attested in Gk. ἔαρ 'spring'.

The few remaining *r*-stems have no morphologically similar cognates: the most important are Av. *ātarš*, gen. *āθrō* 'fire', and Gk. αἰθήρ, -έρος 'the upper atmosphere'. Very likely these are dialectal innovations—on the latter see Kiparsky (1967:626). In that event the status of this group of miscellaneous *r*-stems is questionable. The *r*-suffix in Gk. ἀνήρ, etc., can perhaps still be thought of as originally identical to the *r*-suffix of the kinship terms, since the word denotes a human referent; and the word for 'star' is assumed here to be a loanword. This leaves the word for 'dawn' as the only sure PIE *r*-stem that is neither a kinship term nor deverbative, and so the form is rather suspect, along with the assumption itself that there was a PIE athematic *r*-suffix other than the one attested in kinship terms and the gerundives/agentives.

3.3.4. *The accusative plural of r-stems.* Before the accusative plural desinence in Sanskrit, stem-final postconsonantal sonorant consonants are syllabic and long. Thus affected are *i*-stems (e.g. *agnī́n* 'fires'), *u*-stems (*śátrūn* 'enemies'), and *r*-stems (*bhrā́tr̥̄n* 'brothers'). Thematic nouns also show lengthening (e.g. *devā́n* 'gods'), while *n*-stems are apparently exempt (Vedic *ukṣáṇaḥ*, *ukṣṇáḥ* 'bulls', *áśmanaḥ* 'stones'). The endings themselves in these stem-classes with lengthening are *-n* for masculine nouns and *-s* for feminine (e.g. fem. *svásr̥̄ḥ* 'sisters'), both of which must reflect PIE **-ns*. Clearer reflexes of the PIE ending surface in the external sandhi variants of the masculine ending, e.g. *-ṅr* before vowels (*nr̥̄́ṅr* 'men') and *-ṅḥ* before *p-* (*nr̥̄́ṅḥ pā́tram*). The masculine and feminine endings were themselves probably originally external sandhi variants.

To what extent the lengthening before the accusative plural desinence is an Indo-Iranian innovation, and to what extent it derives from Proto-Indo-European, is a matter of dispute. Brugmann (1897–1916:2.2.224) provides a bibliography of early contributions to the debate. Lengthening in the *r*-stems is certainly an Indic innovation, since there is no lengthening in Avestan (see below), and since the evidence of other languages is also negative, e.g. Hom. θύγατρας. Lengthening in the *o*-stems very probably derives from Proto-Indo-European, given the Baltic evidence, Lith. and Latv. *-us* < *-uos* < **-uons* < **-ōns*. The stage *-uos* is reflected in the accusative endings of definite adjectives, Lith. *-úosius* (dial. *-ū́śus*) and Latv. *-uõs*. However, Schmalstieg (1966, 1968) argues that *-us* is borrowed from the *u*-stems, and the adjective ending is then formed from *-us*. The evidence of nearly all other IE languages is inconclusive: for example, the short vowel in Gk. -ους (<-ονς, preserved in the Cretan-Argolic dialect) may be due to Osthoff's law, and Gothic *-ans* may have suffered the Proto-Germanic shortening of long diphthongs. However, Umbrian *-uf* (=Oscan *-úss*) seems to point to **-ōns*. Buck (1904:47, 127) suggests the ending here was **-ons*, and *o* was lengthened when **-ns* became *-f* in Umbrian; but he himself acknowledges the difficulty that assumption raises for the consonant-stem ending, which is *-f* (corresponding to Oscan *-s*, from **-ens* < **-n̥s*), since this could not show syncope if the vowel had been lengthened. And so reconstructing **-ōns* seems to be the only way to avoid resorting to an analogical explanation. Ultimately I find the Umbrian evidence unconvincing, since regardless of the problems with the accusative plural ending of consonant stems, it is still necessary to assume vowel lengthening before _ns_ in Proto-Italic, e.g. in Oscan _keenzstur_ < _*k̂n̥stōr_, Lat. _cēnsor_ < _*k̂n̥sōr_.

In regard to the _i_- and _u_-stems, there is no good evidence outside of Indo-Iranian concerning possible lengthening before the accusative plural desinence. In Lithuanian and Latvian, acuted long vowels in final syllables have been shortened, and the Umbrian ending _-eif_ (with _ei_ < _*ī_) once again may be due to lengthening in Proto-Italic, as in Latin _-īs_ < _*-ins_, with Latin loss of _n_ assured by the consonant-stem ending _-ēs_ < _*-ens_ < _*-n̥s_.

Regardless of these difficulties with other stem types, as pointed out above, lengthening in the _r_-stems appears to be an Indic innovation. So also the disparity between Skt. acc. pl. _bhrā́tr̥̄n_, _duhitr̥̄́ḥ_, etc. (<_*-tr̥ns_) and Gk. θύγατρας, Gothic _broþruns_, etc. (<_*-trn̥s_) suggests further leveling. In fact one of the predictions of iterative syncope is that some _r_-stem accusatives plural will end in _*-r̥-ns_, and others in _*-r-n̥s_. It was shown above (§2.3) that the close-inflected _i_- and _u_-stems most likely ended in _*-i-ns_ and _*-u-ns_ in Proto-Indo-European, while the open-inflected ones ended in _*-y-n̥s_ and _*-w-n̥s_. It appears then that whether -R_eR- becomes _-R̥R-_ or _-RR̥-_ depends on the weight of the preceding syllable. Under those conditions one might expect _*bhreH-tr̥-ns_, as opposed to _*Hn̥-r-n̥s_ < *H_enr_ens. The two types are apparently both reflected in Avestan, where the former gives _-ərąš_, as in GAv. _matərąš_ 'mothers', and the latter _-rə̄uš_, as in _nərə̄uš_ 'men' (with analogical stem). There is some mixing of types, however, e.g. _nərąš_ occurs once beside _nərə̄uš_ in Younger Avestan (Y. 40.3, beside Yt. 19.52, V. 5.27, 4.44)—counterevidence to Bartholomae's assertion [1895:158] that the two types represent merely a chronological difference.

An especially interesting accusative plural form in Avestan is _fəδrō_ 'fathers', which is quite isolated and anomalous next to the normal Avestan accusative plural endings just discussed. It is, however, the form to be expected under iterative syncope. It was argued above (§3.3.1) that due to homorotony the root of this word should have been in zero grade throughout the paradigm, and Avestan alternations indicate later vocalization of the laryngeal under some external sandhi conditions. In that event the PIE accusative plural to be expected is **pHtróns*, with a full-grade vowel before the ending, since the root had no vocoid for the accent to shift to when the accent did shift in other accusatives plural. Av. *fəδrō* exactly reflects this **pHtróns* (with short vowel: cf. the long vowel in the thematic accusative plural endings masc. *-ə̄ng*, fem. *-å*, presumably from **-ōns*, like GAv. acc. pl. *gå* 'head of cattle' < **g^{w}ōns* < **g^{w}owms*, §2.3).

If the PIE thematic accusative plural ending was **-ōns*, it may reasonably be argued, as it is below (§3.4), that this results from **-o-n̥s*, i.e. the addition of the commonest allomorph of the athematic accusative plural ending to the theme vowel (*after* the development of word-final **-ns* to **-nn* under Szemerényi's law). Perhaps then the Indo-Iranian lengthening of the other stem-final syllabic segments is analogical to the thematic ending. But there are several other possible explanations, and the evidence is too meager to substantiate any very strong claim about the origin of the lengthening in the Indo-Iranian accusative plural.

3.4. THEMATIC DECLENSION AND *Ī*- AND *Ū*-STEMS. It is generally agreed that thematic nouns and adjectives represent a type that has suffered extensive analogical change. There is, however, no consensus about how the analogical changes proceeded, or what the original state of affairs was. The task of reconstructing the origins of thematic declension is severely complicated by the enormous productivity of the class in the PIE period itself, rendering it impossible to determine with any assurance which of the many thematic nouns and adjectives traceable to the PIE period were involved in the original formation of this class, and which are later additions.

Perhaps the most widely accepted view is that of Wackernagel and Debrunner (1896–1954:3.84-8): this class originally showed accent and ablaut alternations like those encountered in athematic stems, but they have been thoroughly obscured by stem regularization. The strongest evidence is the coexistence of otherwise identical thematic stems in different ablaut grades, e.g. Skt. *svápna-*, OIcel. *svefn* (< **swepno-*), beside Gk. ὕπνος, OCS *sъnъ* (<**supno-*) 'sleep'; also Skt. *cakrá-*, OE *hweogol* (but also *hwēol*), beside Gk. κύκλος 'wheel'; and Lith. *béržas* beside Skt. *bhūrjá-*, both denoting kinds of birch. But these are verbal roots: cf. Skt. *svápiti*, OE *swefan* 'sleep'; Skt. *cárati* 'moves', Gk. πέλω 'be in motion'; and Skt. *bhrājate* 'shines'. The reduplication in the word for 'wheel' is especially suspect in this regard. And so the related thematic nouns may have been derived at different times from (or at least may have been influenced by) different ablaut forms in conjugation. More important, however, it is not possible to point to any particular thematic form and say with assurance that this belongs to the oldest stratum of thematic stems. An enormous proportion of thematic stems derives from other stem types: some clear examples are stems in **-tro-* based on the weak form of stems in **-ter-* (e.g. Skt. *bhrātrá-m* 'brotherhood' : *bhrā́tar-* 'brother') and those in **-mno-* based on stems in **-men-* (e.g. Gk. φλογμός 'inflammation' : φλέγμα 'blaze'). Thus thematic nouns like Skt. *svápna-* and Gk. ὕπνος reflected in more than one ablaut grade may reflect late thematizations of different case-forms: in this instance, Pokorny (1959:1.1048) reconstructs a heteroclitic *r*/*n*-stem **swépōr* (in Lat. *sopor* 'deep sleep' : Gk. ὕπαρ 'waking vision'), gen. **supnés*, and derives the thematic forms from these. (Note that quantitative ablaut alternations in the root are to be expected in *r*/*n*-stems—see §3.2.1—while they are not to be expected in normal *r*- and *n*-stems.)

Thus it is not an inescapable assumption that thematic stems originally showed quantitative ablaut alternations. A natural consequence of the assumption that the earliest thematic stems showed such alternations would be the conclusion that the entire thematic declension is probably of post-syncopic origin: it is the result of post-syncopic paradigmatic leveling in originally alternating stems. Undeniably, even the oldest thematic stems have suffered extensive analogical change in regard to inflection, as discussed below; but there is reason to believe that thematic declension does have its origins in syncope. Naturally if the theme vowel dates from syncope, thematic stems must have had columnar accent in Pre-Indo-European, in opposition to the variable accent of athematic stems. On theoretical grounds it ought in fact to be assumed that some Pre-IE simple declensional stems had columnar accent. The analysis of the root-stems offered above (§2.2) tacitly supposes that in the Pre-IE etyma of this type no root-word accented the final vowel before apocope—

i.e., *CáCa*, *CáCaCa*, and *CaCáCa* are assumed before the addition of the case-words, but not ***CaCá* and ***CaCaCá*. That is why root-stems in Proto-Indo-European always had a full-grade vowel in the strong cases, as indicated by the Greek and Latin evidence examined in §2.2. There is no apparent reason, however, that these root-words should never have had final accent, and when it is assumed that such forms did originally exist, it becomes clear why they are not attested as root-stems: under the rules of Pre-IE accentuation the paradigm would have shown no alternation in the place of the accent. Thus underlying the PIE thematic stem **wl̥kʷo-* (>Skt. *vŕ̥ka-*, Lat. *lupus*, Eng. *wolf*, etc.) is the Pre-IE root-word **wàlakʷá*. Since the case-words of the strong cases were atonic clitics, they had no effect on the stem accent, and so the Pre-IE nominative singular was **wàlakʷá-s(a)*; and the tonic clitics of the weak cases merely duplicated the original position of the accent, giving, e.g., dat. sg. **wàlakʷá-y(a)*. (Cf. how the accent of Greek oxytones is unaffected by enclitics: e.g., ποταμός plus τὶς gives ποταμός τις 'a certain river'.) Thus arose a group of unsuffixed stems with columnar accent, resulting in the preservation of a stem-final vowel throughout the paradigm. The same developments should be expected in complex stems, with the result that among the complex stems with non-clitic suffixes, only those that did not accent the final vowel of the suffix will be athematic. Thus PIE stems in **-ter-* and **-men-* (from Pre-IE **-mána-* and **-tára-*) show alternations in the place of the accent, while those in **-tro-* and **-mno-* (Pre-IE **-tará-* and **-maná-*) do not. This account does not explain the vocalism of all the earliest thematic stems: all stems formed in the same way as PIE **wl̥kʷo-* will necessarily have reduced-grade roots, while some evidence presented below suggests that there were full-grade roots among the earliest thematic stems, e.g. PIE **deywo-* (Skt. *deváḥ*, OPr. *deiw(a)s*, Lat. *deus*, etc. 'god'). (The type with full-grade root may be called the A type, and the other the B type, in imitation of Brugmann's classification of thematic conjugational stems—see §4.3.2.) Perhaps stems of the A type also originally had columnar accent, i.e., Pre-IE **dáyaw(a)* yielded **déyw*, and the theme vowel of the other type was inserted as a connecting vowel between stem and ending.

After syncope and the extension of the theme vowel to the A type, all these stems ended in a short vowel. This stage will be designated the PRE-THEMATIC stage. The thematic endings usually reconstructed for Proto-Indo-European do not directly reflect the pre-thematic stage. Rather, many thematic endings show a long vowel, and it is generally agreed that these long-vowel desinences are the result of the contraction of the theme vowel with a desinential vowel—e.g., PIE dat. sg. **wl̥kʷōy* reflects **wl̥kʷo-* plus the normal athematic dative ending **-ey* (but cf. Palmaitis 1982:79–82). Assumption of this hypothetical pre-thematic stage explains how normal athematic endings came to be added to stems that already ended in the theme vowel, since the pre-thematic paradigm presented difficulties of morpheme analysis: if the theme vowel was regarded as belonging to the stem, then the endings of the strong cases were the same as in the consonant-stem declension, but not those of the weak cases—e.g., if nom. sg. **wl̥kʷos* was analyzed as stem **wl̥kʷo-* plus normal athematic desinence **-s*, then dat. sg. **wl̥kʷoy* also had a stem **wl̥kʷo-*, and the ending **-y* was highly anomalous as a dative ending. The same problem persisted if the stem was analyzed as **wl̥kʷ-*, since **-os* was an anomalous nominative ending, and so regardless of whether the theme vowel was analyzed as belonging to the stem or the desinence, the set of case endings was intractable. In the end the analysis **wl̥kʷo-* prevailed, and therefore the endings of the consonant-stem declension were added to the stem with the theme vowel. The only certain exceptions are the nom.-voc.-acc. sg. neuter ending **-om* (of disputed origin) and the gen. sg. ending **-osyo/*-esyo*. The genitive ending, it is generally believed, is borrowed from pronominal declension—for discussion and references see Markey 1980. The most likely reason for the borrowing is that the genitive singular and the nom.-voc. plural of thematic stems would otherwise have fallen together as **-ōs* < **-o-os, *-o-es*. The PIE *o*-stem ablative singular ending **-ōd* must reflect **-o-ed*; though **-ed* is not reflected in IE consonant-stem ablatives, the endings Hitt. *-z* (i.e. [ts]), Hieroglyphic Luwian *-ati*, and Lycian *-adi/-edi* in the athematic stems seem to be based on an ending **-ed/-od* (Bailey 1970:51). This analysis of thematic declension confirms certain of the claims advanced above concerning athematic endings. Sanskrit *-ān(s)* and Lith. *-us* suggest the PIE ending in the accusative plural was **-ōns*, and the length of the vowel ought then to be attributed to the syllabic consonant in **-o-n̥s* (§3.3.4). On the other hand, the accusative singular ending *-om*, with short *o*, indicates that the athematic ending **-m* must normally have been nonsyllabic, as argued above (§2.2). Likewise apparently the athematic locative singular normally was not endingless, since the thematic ending is **-o-y*. It was argued above (§2.4) that the athematic locative was never originally endingless, but **-y* was the normal ending, which was lost under some conditions of external sandhi.

More direct evidence for this analysis is to be found in Anatolian, where this hypothetical pre-thematic stage appears actually to be reflected as such. The desinences of Hittite *a*-stems do not show the long vowels found in most IE thematic weak-case endings, e.g. dat.-loc. sg. *a-ru-ni* 'sea' (with *-i* < **-ey* or **-oy*: cf. the *a*-stem datives Luwian *Kamprušepai* [name of a deity] and Palaic *tabarnai* 'ruler'), but Gk. ἵππῳ 'horse', OLat. *populoi* 'people'. Nor has there been any change in the ending of the genitive singular, e.g. *a-ru-na-aš* : **-osyo* in Skt. *vŕ̥kasya* 'wolf's', Hom. Αἰόλου (proper name, to be read as -οο < *-οιο: Schwyzer 1939–50:1.555). That the Hittite *a*-declension does correspond to the IE *o*-declension, however, is affirmed by the fact that Hittite neuter *a*-stems end in *-an* < **-om* in the nom.-acc. singular, e.g. *i-ú-kan*, *i-ú-ga-an* = Skt. *yugám*, Gk. ζυγόν, Lat. *jugum*, Eng. *yoke*: the *m*-inflection of course is not found with the consonant-stem neuters. It seems rather difficult to derive the Anatolian *a*-declension from the PIE thematic declension: to do so one must assume shortening of all the long-vowel endings; replacement of the thematic ending by the athematic one in the genitive singular, but not in the nom.-acc. singular neuter; and merger of the *ā*-stems with the *o*-stems (as for instance Krahe 1966–69:2.9 assumes). The confluence of all these developments is sufficiently improbable to have evoked skepticism on the part of scholars who can by no means be suspected of sympathizing with the Indo-Hittite hypothesis. Bernhard Rosenkranz independently arrives at the conclusion that the Hittite *a*-declension represents an earlier stage in the development of the thematic declension: he remarks, 'Die indogermansichen *ā*- und *o*-Deklinationen haben keine klare Entsprechung im

Hethitischen. Allerdings gibt es dort *a*-Stämme;... doch unterscheiden sie sich in der Flexion nicht von anderen Stämmen.... Wir betrachten... die hethitischen *a*-Stämme als Schwa-Stämme, das heisst als Vorstufe zu den erst in den einzelnen Sprachzweigen endgültig ausgebauten *o*-Stämmen' (1978:121–2).[5]

The PIE stems in *-ā-* were formed in the same way, except that an *a*-coloring laryngeal was inserted between the theme vowel and the desinence. This laryngeal suffix is of at least three origins: 1) In one group it represents an element that forms abstract nouns from thematic adjectival and verbal stems, e.g. Gk. πινυτή 'intelligence' from πινυτός 'intelligent' (for other Greek examples see Chantraine 1933:18–24; and see Kuryłowicz 1964:212). 2) In a smaller group the suffix is collective in meaning, and is undoubtedly identical in origin to the neuter plural inflection. For athematic nouns the weak stem is used, with theme vowel attached, e.g. Gk. πάτρᾱ 'clan'. 3) Elsewhere **-H-* forms the feminine equivalents of masculine *ò*-stems, e.g. PIE **ek̂weH-* (beside masc. **ek̂wo-*) in Skt. *áśvā*, Lat. *equa* 'mare'. This third suffix is probably abstracted from demonstrative pronominal forms: cf. nom. sg. **seH* in Skt. *sā*, Gothic *so*, Gk. ἡ; and anaphoric fem. **iH* (masc. **is*) reflected, in various guises, in Skt. *iyám*, Lat. *ea*, and Gothic acc. *ija*. This assumption of pronominal origin for the feminine marker is based on the observation that, as generally agreed, the PIE system of grammatical gender evolved from a system of natural gender; and in languages with natural gender, gender rarely lacks formal expression in the pronominal system, while it may lack obligatory formal expression in all other categories—as in English. The formal identity of these three laryngeal suffixes is then primarily responsible for the rise of grammatical gender in Proto-Indo-European: in addition to their abstractive and collective meanings, the first two suffixes acquired secondary feminine associations reinforced by the preexisting formal distinction between animate and neuter (or inanimate) pre-thematic nouns. Conversely, the feminine form of thematic adjectives could acquire abstract meaning (Kuryłowicz 1964:213–4; and cf. Brosman 1982, with a bibliographical survey).

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[5] I have myself been reluctant to assume any firm position on the genetic relationship of Anatolian to the other IE branches, but this evidence is difficult to blink. For some specific arguments against the notion that the genitive ending of the Hittite *a*-declension could be a dialectal innovation, see Rosenkranz (1979:221).

Thus the *ā*-stem endings were nom. **-o-H-s*, acc. **-o-H-m*, gen. **-o-H-os*, dat. **-o-H-ey* (or *e*-grade in any of these), etc. This reconstruction explains the lack of *-s* in the nominative singular of *ā*-stems: apparently **-eHs* was assimilated to **-eHH*. It is true that under Szemerényi's law such assimilation of *-s* in the nominative singular affected only stems in dental consonants; but given the general assumption that most or all laryngeals were fricatives, assimilation of word-final *s* at least before consonants in external sandhi is not implausible.

In the genitive, pronominal declension offered no alternative ending as in the masculine, and so the genitive singular and nominative plural of *ā*-stems fell together. They are redifferentiated dialectally, and this explains the innovative endings in Greek (nom. pl. -αι : gen. sg. -ᾱς), Sanskrit (gen. *-āyāḥ* : nom. pl. *-āḥ*), and Old Latin (nom. pl. *-ae* : gen. sg. *-ās*, as in *pater familiās*). The Indo-Iranian weak cases have been remodeled, by the insertion of *-ā̆y-* between stem and ending, e.g. Skt. gen. sg. *-āyāḥ*, dat. *-āyāi*, instr. *-ayā*. The source of this insertion is disputed, but it at any rate seems likely that the new endings are designed to preserve the dissyllabicity of the original ones. In the Vedas there are a few dissyllabic scansions of the acc. pl. ending *-āḥ* (<**-oHn̥s*), though the evidence for dissyllabic nom. pl. *-āḥ* is questionable (Lanman 1877:362–3).

The thematic stems certainly have suffered extensive analogical processes, and so evidence for any reconstruction of the original state of affairs is meager. The Anatolian *a*-stems provide evidence for the pre-thematic stage, but there is no direct evidence for that earlier stage at which these stems were uninflected, and the theme vowel was retained only when it bore the primary accent, thus escaping apocope. The *ī*-stems, however, offer some indirect evidence for this stage. The *ī*-stems are largely derivatives of masculine nouns and adjectives, providing feminine equivalents of these. They are of two types, commonly designated the *devī-* and *vr̥kī*-types (or the stems in *-yā* and *-ī*), after the commonest representatives of the two types in Vedic, *devī́* 'goddess' and *vr̥kī́ḥ* 'she-wolf', corresponding to masc. *deváḥ* and *vŕ̥kaḥ*. Paradigms are provided in Table 3.4a. The *devī*-type is extensively reflected in many IE languages, but traces of the *vr̥kī*-type are few outside of Indic. Still, they are sufficient to indicate the PIE origin of the type: the best evidence is OIcel. *ylgr* < PGmc. **wulgiz* = Vedic *vr̥kī́ḥ* (note that even the anomalous final *-*s* is reflected in the Icelandic word). The duality of inflectional types is reminiscent of the distinction between open and close inflection in the *i*- and *u*-stems, and suggests

sg.	nom.	*devī́*	*vṛkī́ḥ*
	acc.	*devī́m*	*vṛkyàm*
	gen.	*devyā́ḥ*	*vṛkyàḥ*
	dat.	*devyāí*	*vṛkyè*
	loc.	*devyā́m*	*vṛkī́*
	instr.	*devyā́*	*vṛkyā̀*
pl.	nom.	*devī́ḥ*	*vṛkyàḥ*
	acc.	*devī́ḥ*	*vṛkyàḥ*
	gen.	*devīnā́m*	*vṛkīnā́m*

Table 3.4a. Paradigms of Vedic *devī́* 'goddess' and *vṛkī́ḥ* 'she-wolf'.

the possibility of a similar origin. The *ī*-stem suffix is generally reconstructed as *-*yeH*-, in alternation with *-*iH*-, probably identical in origin to the feminine anaphoric determinative mentioned above, reflected in Skt. *iyám*, Lat. *ea*, and Goth. acc. *ija* (but cf. Kuryłowicz 1964:218), and which apparently was originally enclitic, at least in the strong cases (see Szemerényi's reconstruction of the paradigm, 1980:189–91). The endings of the *ī*-stems can then be accounted for if it is assumed that just as with the *i*- and *u*-stems, the stem-forming suffix was an atonic clitic in Pre-Indo-European, and so was incapable of receiving primary accent from the tonic clitic weak-case endings. Thus the accent of this class was originally columnar. Just as with the *i*- and *u*-stems, after the assignment of secondary stress, and after the loss of all unstressed vowels, but before the reduction of vowels with secondary stress to *$_e$, the accent shifted to the last vowel of the word in the weak cases, in order to bring the accentuation of this class into line with that of the athematic stems. The process is illustrated in Table 3.4b, where column I represents the pre-syncopic form; column II represents the form after the loss of unstressed vowels but before the reduction of vowels with secondary stress to *$_e$; column III represents the effects of the accent shift; and column IV represents the early PIE form, after the reduction of *à to *$_e$ and the subsequent change of *$_e$y/y$_e$ to *i. Note that in the

		I	II	III	IV
devī-type					
sg.	nom.	*´-C-yàHa-s(a)	> *´-C-yàH-s		> *´-CiHs
	acc.	*´-C-yàHa-m(a)	> *´-C-yàH-m		> *´-CiHm
	gen.	*´-C-yàHa-s(a)	> *´-C-yàH-s	> *ˋ-C-yáHs	> *-CyéHs
	dat.	*´-C-yàHa-y(a)	> *´-C-yàH-y	> *ˋ-C-yáHy	> *-CyéHy
	instr.	*´-C-yàHa-H(a)	> *´-C-yàH-H	> *ˋ-C-yáHH	> *-CyéHH
pl.	nom.	*´-C-yàHa-s(a)	> *´-C-yàH-s		> *´-CiHs
	acc.	*´-C-yàHa-m(a)	> *´-C-yàH-m	> *ˋ-C-yáHm	> *´-CiHm(+s)
	gen.	*´-C-yàHa-Hàm(a)	> *´-C-yàH-Hàm	> *ˋ-C-yàHHám	> *-CiHHóm
vṛkī-type					
sg.	nom.	*-Cá-yaHà-s(a)	> *-Cá-yHà-s	> *´-Cà-yHàs	> *´-CiH$_e$s
	acc.	*-Cá-yaHà-m(a)	> *-Cá-yHà-m	> *´-Cà-yHàm	> *´-CiHm
	gen.	*-Cá-yaHà-s(a)	> *-Cá-yHà-s	> *-Cà-yHás	> *-CiHós
	dat.	*-Cá-yaHà-y(a)	> *-Cá-yHà-y	> *-Cà-yHáy	> *-CiHéy
	instr.	*-Cá-yaHà-H(a)	> *-Cá-yHà-H	> *-Cà-yHáH	> *-CiHéH
pl.	nom.	*-Cá-yaHà-s(a)	> *-Cá-yHà-s	> *´-Cà-yHàs	> *´-CiH$_e$s
	acc.	*-Cá-yaHà-m(a)	> *-Cá-yHà-m	> *-Cà-yHám	> *´-CiHm(+s)
	gen.	*-Cá-yaHà-Ham(a)	> *-Cá-yHà-Hm	> *-Cà-yHáHm	> *-CiHóHm

Table 3.4b. Effects of the shift of accent on the case endings of the two types of ī-stems.

_vr̥kī_-type not only does the accent shift to the desinence in the weak cases, but it also shifts from the theme vowel to the root in the strong cases. Once again, of course, the root vocalism is later regularized in the paradigms of both types.

The general results in the weak cases are clear: PIE *_-yeH-_ in the _devī_-type yields Vedic _-yā-_, while PIE *_-iHe-_ in the _vr̥kī_-type gives _-iya-_, spelt _-yà-_. This analysis accounts for the general condition that in the Rigveda the suffixal _y_ is almost always syllabic in the weak cases of the _vr̥kī_-type, regardless of the number of preceding consonants (with just three exceptions out of approximately 150 instances), while more often than not it is nonsyllabic in the weak cases of the _devī_-type, and quite frequently so even after heavy syllables (Seebold 1972:184–90; and see the discussion above, §§1.3, 1.9). Thus the theory of iterative syncope explains what is perhaps the most prominent exception to Sievers' law in Vedic Sanskrit.

Just as with the _i_- and _u_-stems, the dative and locative singular would have fallen together, as would the nominative singular and plural, if they had not been artificially redifferentiated. In both types the Vedic dative singular reflects the original state of affairs; _-yām_ in the locative of the _devī_-type is the same ending found in the _ā_-stems, apparently drawn from pronominal declension, and not found in Avestan _ā_-stems (no locative singular of an _ī_-stem is attested in Avestan, but cf. OP _harahuvatiyā_ [place name], for _-tyā_ [Bartholomae 1895:230, 160]); in the Vedic _vr̥ki_-type the normal athematic locative ending replaced PIE *_-ey_, just as with the open-inflected _i_- and _u_-stems, as argued above. In the nominative, apparently the plural endings are original: nom. pl. *_-CiHs_ may be supposed to give Vedic _-īḥ_, for although it was suggested above that *_-Hs_ was assimilated to *_-HH_ in the _ā_-stems, it was also suggested that this change only took place before consonants in external sandhi, and therefore Vedic nom. sg. _-ī_ and _-īḥ_ are both phonological reflexes of *_-iHs_, representing generalized external sandhi variants. (For further evidence for the existence of such variants, see §3.5.) In the _vr̥ki_-type the Vedic nom. pl. _-yàḥ_ is phonologically correct, since *$_e$ ought to have been restored to full grade in *_-CiH_$_e$_s_; the nominative singular then must be analogical (to athematic nominatives), and understandably so, since the vocalism of the phonologically correct ending would have been the same as that of both the nominative plural and the genitive singular.

The accusative plural endings of both types are phonologically regular: the *vr̥kī*-type is self-explanatory, and in the *devī*-type apparently the **H* was lost before the nasal consonant could be vocalized. It should be pointed out that the accusative plural has suffered another accent shift between stages III and IV in the table. It was argued above (§2.2) that the regular accent shift in all athematic accusatives plural, converting this from a weak case to a strong one, did not take place until after the reduction of **à* to ***$_e$. Therefore the accusative plural was still a weak case when the accent shift of column III applied, and so must have suffered that shift, though the general accusative plural accent shift righted matters before the stage represented by column IV.

Finally the prediction under iterative syncope is that in the *devī*-type the genitive plural ending should have developed a long stem vowel and a short desinential vowel after the loss of laryngeals (i.e., **-iHHom* > Vedic **-īyam*), while in the *vr̥kī*-type the quantities were reversed (**-iHoHm* > **-iyām*, with dissyllabic *ā*). The former type is of especial interest, since it is yet another form that helps to explain how Celtic and Slavic can reflect a genitive plural ending with short desinential vowel, where other branches reflect a long vowel (see §§2.1, 2.3). But the long stem-vowel **ī* in this ending is also of some importance, as this vowel probably served as the model for lengthening of stem-final vocoids before the Indo-Iranian analogical genitive plural ending. In Indic the analogical ending *-nām* (as in the table) is added to the genitive plural of most stems ending in sonorants (including vowels), and under these conditions the sonorant is syllabic and long, e.g. gen. pl. *pitr̥̄ṇā́m* 'fathers'. The same development is found in Avestan, though somewhat less regularly, and with a narrower distribution. The coöccurrence of two different genitive plural endings in the *ī*-stems, as well as in the *i*- and *u*-stems, is itself the best explanation why the genitive plural required such analogical regularization in Indo-Iranian. Most likely it should be assumed that *n* in this ending is the same Indo-Iranian hiatus-filler found at other points of juncture, e.g. in the instrumental singular of most *i*- and *u*-stems, and in the nom.-acc. plural neuter ending of thematic stems, as discussed above (§2.3). In the _ī_-stem genitive plural endings, then, _n_ was inserted to fill the hiatus upon loss of the laryngeals. That the vowel after the _n_ should always be long is not surprising, though it does require the assumption of some leveling. What is surprising, however, is that a stem-final vocoid should always be lengthened before _-nām_, and that development is explained by the model of the _devī_-type ending reconstructed here. The _devī_-type of _ī_-stem, after all, unlike the _vr̥kī_-type, is a large class of stems in Indo-Iranian, and so may easily have served as the model for such a development.

There is then much analogical change in the development of the _ī_-stems, and some of it from an early date, but the essential difference between the _devī_- and _vr̥kī_-types has not been obscured, and may be expressed as _*-iH-/ -yeH-_ : _-*iH_$_e$_-/ -iHe-_. This analysis of the _ī_-stems provides evidence for the contention that the B type of thematic stem accented the root-final vowel in Pre-Indo-European, and so retained that vowel after syncope, while the root-final vowel of the A type is a later addition to the stem—i.e., syncope produced _*wl̥k_^{w}_o-_ in the B type, but _*deyw-_ in the A type. Above (§2.3) it was shown that once syncope is taken into account, whether an _i_- or _u_-stem is open or close-inflected correlates to the number of vowels following the accented vowel in the Pre-IE root. The _ī_-stems can be said to conform largely to a similar pattern if it is assumed that the _devī_-type is based on roots that have suffered apocope, and the _vr̥kī_-type on roots that accented the root-final vowel in Pre-Indo-European, and so escaped the effects of apocope. The _ī_-stems are (or were originally) largely derivatives of thematic stems. The enclitic pronoun _*yaHa-_, with case ending, was added to the uninflected 'thematic' stems after apocope but before syncope; so acc. sg. _*dáyaw-yàHa-m_ > _*déywy_$_e$_Hm_, and dat. sg. _*dáyaw-yàHa-y_ > _*dáywyàHy_ > _*dàywyáHy_ > _*d_$_e$_ywyóHy_, with later leveling of the strong stem into the weak cases; but acc. sg. _*wàlak_^{w}_á-yaHà-m_ > _*wàlk_^{w}_áyHàm_ > _*wálk_^{w}_àyHàm_ > _*wélk_$^{w}_{e}$_yH_$_e$_m_, and dat. sg. _*wàlak_^{w}_á-yaHà-y_ > _*wàlk_^{w}_áyHày_ > _*wàlk_^{w}_àyHáy_ > _*w_$_e$_lk_$^{w}_{e}$_yHéy_. In the latter instance it is the weak stem that is extended throughout the paradigm, showing that the tendency is for the feminine noun to adopt whichever of the two stems agrees with the thematic equivalent on which the _ī_-stem is based. There seems to be just one exception in Vedic, _śácī_ : masc. _śā́ka-ḥ_ 'might', though this ablaut relationship is not clear. This does not mean that the *devī*-type will always reflect roots in full grade, and the *vr̥kī*-type those in reduced grade. After all, the *devī*-type was tremendously productive, attracting many athematic stems, while the *vr̥kī*-type was not so productive. That the one but not the other is reflected well in languages other than Indic is a sign that their relative degrees of productivity were already established in Proto-Indo-European. Accordingly, the root vocalism of the *devī*-type is of little practical value in reconstructing the earliest pattern of PIE root vocalism. There is a relatively high incidence of reduced grade in the roots of Vedic stems of the *vr̥kī*-type, but here, too, of the eighty or so attested stems there are many demonstrably post-PIE accretions, e.g. *atharī́-* 'flame' and *atharvī́-* 'priestess', based on a word borrowed from Iranian (Pokorny 1959:1.69), and quite a large number of apparently non-IE roots, e.g. *kilāsī́-* 'spotted deer', *simhī́-* 'lioness', *arāyī́-* 'demoness', etc., along with patently late formations like *gāurī́-* 'buffalo cow' and *gandharvī́-* 'celestial musician' (masc. *gandharvá-*). Moreover, while it is clear that an accented Pre-IE root like **dáyaw*, with an odd number of vowels after the accented vowel, will form an *ī*-stem of the *devī*-type, what of accented roots with an even number of vowels in this position? A form of the order *CáC-yaHà-m* ought to give *CéCyH*$_e$*m*, with an unpronounceable consonant cluster and a desinential structure like a *vr̥kī*-type. Perhaps with vocalization of *y*, stems like these found their way into the *vr̥kī*-class: *nadī́-* 'stream', for instance, might be an example of such a stem. Or perhaps the cluster *-CyH-* was simplified: after all, between the time of syncope itself and the rise of syllabic consonants the *y* in the cluster would not automatically have been vocalized as it would at a later stage when alternations between syllabic and nonsyllabic allophones of the resonants came to be conditioned solely on the basis of phonological environment—cf. the loss of *m* in forms like Skt. *budhná-* and instr. sg. *áśnā* (§3.2.2). At any rate, although quite a few Vedic nouns of the *vr̥kī*-type are unlike *vr̥kī́ḥ* in their root structure and vocalism, the original pattern is still discernible in undeniably archaic paradigms like those of *devī́* and *vr̥kī́ḥ*, and later additions to the class of *ī*-stems ought not to be accorded the status of counterevidence to the analysis proposed here. Rather, the really valuable conclusions to be drawn from observing the composition of the roots that constitute the Vedic *vr̥kī*-type are that 1) probably the earliest stratum of *ī*-stems contains only derivatives of thematic stems, since the unproductive *vr̥kī*-type includes almost no derivatives of athematic stems, while the productive *devī*-type includes many, along with thematic stems, and 2) both types regularly violate Sievers' law, since the suffixal *y* of the *devī*-type is frequently nonsyllabic after heavy syllables, while it is always syllabic in the *vr̥kī*-type. The combined implications of these two observations lend credence to the history of the thematic stems outlined above.[6]

It was suggested above that the feminine marker **yaHa*- is identical in origin to the feminine anaphoric demonstrative. This assumption accords well with the typological universal formulated by Greenberg (1978a) that in natural languages gender marking and agreement invariably originate in the use of a demonstrative. That **yaHa*- was added to the stem *after* apocope is corroboration for the assumption that it is identical in origin to the feminine anaphoric pronoun: it is not a calcified suffix like *ya- and *wa- in the i- and u-stems—unproductive by the time of apocope, and preserving relic non-apocopated roots—but a genuine demonstrative that continued to be used productively after apocope. The coexistence of reflexes of *yaHa- as both an ī-stem ending and an anaphoric pronoun is to be explained as the result of syntactic limitations imposed by syncope. Before syncope *yaHa-, when attributive, could be added directly to the bare stem. Syncope, however, rendered it difficult to continue use of the demonstrative in that position: the division between stem and desinence became arbitrary, at least in the pre-thematic stems, and at any rate the ī-stem endings certainly came to be regarded as signs of a stem class. Thus the anaphoric pronoun after syncope came also to be used without enclisis, and the older enclitic forms acquired a specialized function, forming a new stem-class of feminine nouns.

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[6] It should be added that since the stem-forming suffix of the *ī*-stems was probably originally a pronoun, its use at first must have been optional. This is why the loss of the *ī*-stem category in Anatolian (a plausible development) really has no bearing on the question whether the feminine gender has actually been lost in Anatolian (less plausible), since it may be assumed that at the time of the separation of Anatolian the indication of feminine gender was still optional, based on semantic requirements rather than grammatical ones—just as it is in Hittite, though the Hittite optional feminine suffix *-ššaraš* is not pronominal. Thus Meid (1979:167–9) is right to point out that the absence of feminine grammatical gender as a *function* in Hittite does not reflect on the question whether certain ablauting *forms* (distinctly associated with feminine grammatical gender in non-Anatolian languages) can be assumed to have arisen prior to the separation of Anatolian. In other words, the absence of grammatical feminine gender can still be considered an archaism in Hittite even if the absence of *ī*-stem formations in Hittite is regarded as an innovation—as it certainly must be, since the quantitative ablaut alternations they display were clearly established already at the close of the Pre-IE period. For a good bibliographical overview of the controversy over the absence of feminine grammatical gender in Anatolian see Brosman (1981).

The Rigvedic ū-stems are declined the same way as the root-stems in ū—that is to say, they correspond to the *vr̥kī*-type of ī-stem. Some few forms corresponding to the *devī*-type begin to appear in the later Vedic material (e.g. acc. sg. *vadhvàm* in the Rigveda, but *vadhū́m* 'bride' in the Atharvaveda), and this separate type is fully established in the classical language. It is undoubtedly true, then, as is generally supposed, that the latter type is analogical to the ī-stems, and only the former type derives from Proto-Indo-European. Unlike the ī-stems, the Vedic ū-stems are not derivatives of thematic stems—rather, they are feminine derivatives of masculine u-stems. Adjectives in -i-, on the other hand, do not form feminines in -ī-. The derivational difference ultimately explains this incongruity between the ī- and ū-stems: *-yaHa- was a Pre-IE 'suffix', an enclitic pronoun, while **-waHa- was not. The best way to account for the ū-stems is to assume that they, like the ā-stems, were formed by the addition of *-H-, plus the athematic case endings, to an invariable stem ending in a vowel. Analogy to the root-stems in -uH- doubtless played a role in shaping the phonological development of this class.

The ū-stems represent just one of three ways feminine stems could be formed from masculine u-stems: the masculine stem itself could also be used (e.g., Vedic nom. sg. *cā́ruḥ* 'dear' is both masculine and feminine), or the suffix of the *devī*-type of ī-stem could be added (e.g. Vedic masc. *urú-*, fem. *urvī́-* 'broad'). The former type is archaic to the extent that the identity of masculine and feminine forms is archaic, and the type dates from a time when there was only an uter/neuter distinction in Proto-Indo-European, as in Anatolian. The latter type is clearly secondary, a result of the enormous productivity of the *devī*-type of *ī*-stem inflection. Between the two stand the *ū*-stems, which reveal a symmetrical arrangement in Proto-Indo-European. Of these three feminine stem-types, *ī*-, *ā*-, and *ū*-stems, only the first is of pre-syncopic origin. After apocope, but before syncope, **yaHa-* was added indiscriminately to stems ending in a consonant or a vowel (necessarily accented). After syncope the resulting *ī*-stem suffixes could only be analyzed as being attached solely to stems ending in consonants, since syncope always deleted a full-grade vowel before the suffix. The feminine suffix **-H-* was then abstracted from pronominal declension for use with stems ending in vowels. This explains both the limited distribution of **-H-* as a feminine marker (since it is never attached to stems ending in consonants) and the proliferation of the *devī*-type of *ī*-suffix among athematic stems. And so the task of forming feminine equivalents was divided between **-yeH-/-iH-* and **-H-*, the former being added to consonantal stems, and the latter to vocalic stems. The *u*-stems, however, could be analyzed as either vocalic or consonantal stems, since the syllabicity of the *u*-element alternated in the paradigm, and so are found both *ū*-stems and *ī*-stems serving as the feminine equivalents of *u*-stems. This analysis is corroborated by the fact that the *u* element always has its nonsyllabic form before the **-yeH-/-iH-* suffix: cf. Gk. fem. βαρεῖα 'heavy' (<*-ϵϝι̯α : masc. βαρύς), Goth. fem. nom. pl. *kaurjos* 'idem' (<**kurwjōs* : masc. nom. sg. *kaurus*), and Lith. gen. sg. *plačiōs* 'wide' (<**platwyōs* : masc. nom. sg. *platús*).

3.5. THE *S*-STEMS AND CALAND'S LAW. Most *s*-stems are neuter, and among these the stem-forming suffix takes the form *-os* in the nom.-acc. singular, and *-es-* elsewhere. A typical paradigm is provided in Table 3.5. The Sanskrit nom.-acc. plural is an innovation: once anusvāra is factored out, the ending is **-āsi*, cognate to which is the rare Avestan ending *-āhī* (e.g. GAv. acc. pl. *varəčāhī[-ča]* = Skt. *varcāṁsi* 'vigor'), beside usual *-å(s)* < Indo-Ir. **-ās*. And so

Szemerényi (1980:159) is undoubtedly right to reconstruct *_-os-H_. It may be supposed that under some external sandhi conditions final *_H_ was assimilated to the preceding _s_ (just as *_-Hs_ before consonants gives *_-HH_ in the nominative singular of _ā_- and _ī_-stems), giving *_-ess/-oss_ > *_-ēs/-ōs_, while under other conditions *_H_ was preserved and later vocalized. The ending *_-āsi_ then represents a mixture of the two—the same sort of mixture, Szemerényi points out, encountered in the neuter plural ending _-āni_ of Sanskrit _n_-stems.

		Skt.	Gk.	Lat.	PIE
sg.	nom.-acc.	_jánaḥ_	γένος	_genus_	*_ĝenos_
	gen.	_jánasaḥ_	γένεος	_generis_	*_ĝenes-os, -es_
	dat.	_jánase_	—	_generi_	*_ĝenes-ey_
	loc.	_jánasi_	γένεϊ	_genere_	*_ĝenes-i_
pl.	nom.-acc.	_jánāṁsi_	γένεα	_genera_	*_ĝenes-eH, -H̥_
	gen.	_jánasām_	γενέων	_generum_	*_ĝenes-oHm_

Table 3.5. Reflexes of Proto-Indo-European *_ĝenes-_ 'kin, family' in Sanskrit, Greek, and Latin.

There is a variety of theories about the origin of the _s_-stems. Brugmann (1897–1916:2.1.515–6) asserts that these are in origin no different from other athematic stems: full-grade vocalism of the suffix has been extended analogically throughout the paradigm, and reduced or zero grade of the suffix was once to be found in the paradigm. As evidence he points to infinitives like Sanskrit dat. sg. _stuṣé_, loc. sg. _stóṣi_ 'praise', beside _bhárase_ 'bear', Lat. _agere_ 'do'; and various relics, usually with weak grade intact because the word was preserved in a compound or transferred to a different stem class, e.g. PIE loc. sg. *_dek̂s-i_ in Skt. _dákṣiṇaḥ_, Gk. δεξιτερός 'dextrous', beside *_dek̂es-_ in Lat. _decus_ 'honor', etc.; and *_lewks-_ in Av. _raoxšna-_ 'illuminating' Lat. _lūna_, Praenestine _Losna_ (proper name), etc., beside *_lewkos-_ in Skt. _rócas-_, Av. _raočah-_ 'light'. In both Greek and Sanskrit, the neuters regularly accent the root, and this appears to be the original situation, since the root is usually in full grade. But Brugmann also points out a few instances in which the root is in reduced grade, e.g. Skt. *śíras-* 'head' (<**kŕ̥Hes-*) beside Gk. κέρας 'horn', and Gk. λίπος 'grease' beside Skt. *répas-* 'stain'. He suggests that these forms point to original ablaut alternations in the root as well as the suffix.

There is perhaps corroboration for Brugmann's view in Hittite, since one of the four attested *š*-stems shows the expected quantitative ablaut: nom.-acc. sg. *a-(i-)iš* 'mouth', nom. pl. *a-i-iš-ši-iš* : gen. sg. *iš-ša-aš*, dat.-loc. *iš-ši(-i)*. These forms will be examined in more detail below.

Schwyzer (1939–50:1.515) argues that the stems of *s*-stems are in origin genitives of root-stems, to which athematic endings have been added. This process is in fact paralleled in Hittite, where some genitives in *-aš* seem to have been interpreted as nominative *a*-stem adjectives (Sturtevant and Hahn 1951:1.79). But this analysis makes it difficult to account for forms like Vedic *stuṣé* (above) with zero-grade suffix; and at any rate, *s*-stems are primarily deverbative rather than denominative (Risch 1974:77), and *s*-stem nouns with related root-stems are quite few. Hirt's idea (1921–37: 3.191) that the suffix *-es-/-os-* forms a verbal noun, and derives from the root **es-* 'be', once again does not explain *stuṣé* and such; and it seems peculiar that **es-* 'be' should have been added to verbal roots to form nouns.

It is a peculiarity of *s*-stems that besides stems in **-es-* there are many in **-is-* and **-us-* (and in fact only rarely are stems in **-yes-* and **-wes-* encountered), but none in **-r̥s-*, **-n̥s-*, etc. None of the above theories of the origin of *s*-stems accounts for this structural regularity. This peculiarity is, however, reminiscent of a similar regularity elsewhere in PIE declension. It does not seem to have been recognized that structurally *s* in these stems is distributed the same way the element **H* is in the *ā*-, *ī*-, and *ū*-stems. In these stem types **H* appears after *e/o*, *i*, and *u*, but never after a consonant, because **H* was not added until after syncope, as explained above (§3.4). The possibility arises, then, that the *s*-stems are more closely related to the thematic stems than to the athematic—that the stems in *-es-* are formed in much the same way that masculine *o*-stems and feminine *ā*-stems are formed from the pre-thematic declension.

There is evidence for such an origin in the facts concerning Caland's law. It was first pointed out by W. Caland (1890:266–8; 1891:592) that in Avestan and Sanskrit the adjective suffix *-ra-* < **-ro-* is replaced by *-i-* when the stem is the first member of a compound, e.g. YAv. *dərəzra-* 'forceful' : *dərəzi-taka-* 'moving forcefully'. Jakob Wackernagel (1897:8–14) pointed out the same alternation in Greek (e.g. Hom. κῡδρός 'honored' : κῡδι-άνειρα 'bringing men honor'), and it has since been referred to as 'Caland's law'. Now it is recognized that quite a few suffixes participate regularly in this system of alternations. In Greek, the usual comparative and superlative adjective suffixes are -τερος and -τατος respectively, yet adjectives affected by Caland's law drop -ρος and add -ῑων (sometimes with short ι in Homer) and -ιστος, respectively, e.g. Attic κῡδίων 'more honored', superl. κύδιστος; cf. Skt. *kṣiprá-* 'quick', comp. *kṣépīyān*, superl. *kṣépiṣṭha-*. The adjective suffix *-u-* behaves as **-ro-* does, and is as common, e.g. Skt. *urú-* 'broad', comp. *várīyūn*, superl. *váriṣṭha-*; and frequently, at least in Greek, there are reflexes of parallel forms in **-u-* and **-ro-*, e.g. Hom. γλυκύς beside γλυκερός, both 'sweet' (on this alternation see Bloomfield 1925 and Specht 1938). A few other suffixes are less frequently encountered, e.g. an adjectival *n*-suffix, as in Hom. πυκνός 'shrewd' (cf. πυκι-μηδής 'shrewd in counsel') and adverbial -α (πύκα 'shrewdly'). These suffixes are sometimes referred to collectively as 'Caland's suffixes' (see, e.g., Risch 1974:65, with other Homeric examples).

The relevance of Caland's law to the *s*-stems is that PIE **-es-* is one of Caland's suffixes. The interchange of **-es-* with the other suffixes is in fact one of the better-attested alternations in this group, e.g. Hom. κῡδρός (above) : neut. κῦδος 'honor'; κρατύς, κρατερός 'strong' : n. κράτος, κάρτος 'strength'; αἰσχρός 'insulting' (αἰσχίων, αἴσχιστος : n. αἶσχος 'insult'; Skt. *urú-*, *várīyān*, *váriṣṭha-* (above) : n. *váraḥ* 'breadth'; *ugrá-* 'strong', comp. *ójīyān*, superl. *ójiṣṭha-* : n. *ójaḥ* 'strength', etc. The origin of the alternations among Caland's suffixes ought to shed considerable light on the *s*-stems. It can of course be remarked that the involvement of the *s*-stems in this group initially sets them apart from most other athematic stems, those with originally variable accent. However, the cause of Caland's law is much disputed. Kuryłowicz (1964:232) and Szemerényi (1964:395–8) contend that, historically, forms of the stem with *-i-* are older than those with *-r-*, and so compounds like κῡδι-άνειρα, and probably the comparative and superlative suffixes, as well, contain relic formations, reflecting the PIE situation before the adoption of *-r-* in the adjective stems. By extension, one imagines, it must be concluded that forms with the suffixes *-u-*, *-es-*, etc., must also be later than those with *-i-*: after all, there is no point to asserting the antiquity of -ι- in κύδιστος, replaced by -ρ- in κῡδρός, if -ι- is not also old in βάθιστος, and replaced by -υ- in βαθύς 'deep, high'. There are several reasons to doubt this hypothesis:

1) Forms like κρατύς (superl. κράτιστος, Hom. κάρτιστος) and παχύς 'thick' (πάχιστος) are certainly very archaic. They reflect open- and close-inflected *u*-stems, respectively (cf. Vedic *krátu-* 'vigor' and *bahú-* 'thick'), and it was argued above (§2.3) that the origin of this distinction lies at an extremely archaic state of the protolanguage, the time of syncope. Since the open-inflected *u*-stems are not a productive class, κράτυς in particular discourages the supposition that an original *i*-stem has been replaced by an *u*-stem.

2) The claim that the stems in *-i-* are older presupposes that the PIE morphological processes of compounding and adjective comparison are fairly old, or at least predate the interchange of *-i-* with the other suffixes. The Anatolian evidence suggests otherwise. There is no comparative or superlative suffix for adjectives in Anatolian: comparison is effected by means of a dative-locative construction (see Friedrich 1960–67: 1.61, 127). It is possible that the forms *ḫa-an-te-iz-zi-iš* 'first', *ap-pí-iz-zi-iš* 'later, last', *ša-ra-az-(zi-)iš* 'upper, best', and *kat-te-ir-ra-aš* 'lower', contain suffixes of comparison, though that is doubtful (see Rosenkranz 1978:122); and at any rate these could not be Caland's suffixes, and do not show suffixal *-i-* before the suffix. Nor is there compounding in Anatolian comparable to the highly developed sort found in other IE branches, and so naturally the use of *-i-* as an element in compounds is not attested. Still, Anatolian does show a widespread interchange of suffixes that is certainly to be identified with the interchange of Caland's suffixes. The

clearest example is the use of *-u-* as a separable adjective suffix, e.g. in *parku-* 'high' : *park-*, *parkiya-* 'become high', *pargatar*, *pargašti-* n. 'height'; *daššu-* 'strong' : *daššiyatar*, Luwian *daššiyama-* 'oppression' (based on **daššiya-* 'oppress'); and Hitt. *panku-* (gen. *pangawaš*, *pankuš*) 'all, general' : instr. *pangarit* 'in force, in great numbers' (with Caland's suffix **-ro-?*). And so it seems likely that at least the interchange of the adjective suffix *-u-* with other suffixes antedates the rise of IE compounding and adjective comparison.

3) There is some reason to think that Greek adjective stems in -ερος and -αρος, beside the more usual -ρος, preserve an archaism that predates the addition of **-i-* to the same roots in compounds. Only **-ros* is well attested outside of Greek, though there are a few forms to indicate that -ερος and -αρος date from PIE times, as well, e.g. Skt. *pataráḥ* 'flying' (cf. Gk. πτέρον 'feather, wing') and *badhiráḥ* 'deaf'. Schwyzer (1939–50:1.482) explains a few of the forms in -ερος as based on verbal stems in -ε-, namely Hom. διερός 'fresh, active' : διέμαι 'speed, press on'; *σχερός (only in ἐν σχερῷ and adv. ἐπισχερώ 'in a row') : σχεῖν aor. inf. 'have' (**sgh-es-en*); and Attic φοβερός 'fearful' : φοβέω 'fear'. The rest are then analogical to these. But Schwyzer's explanation cannot be correct, since all adjectives in -ερος have reduced-grade roots. Many adjectives in -ρος have full-grade roots (e.g. πηρός 'maimed, disabled', and σκληρός 'hard, harsh'; other examples below), and so if adjectives in -ερος were analogical creations, it should be expected that some of them would have full-grade roots. Rather, the coöccurrence of -ερος with weak-grade roots suggests that -ε- in this suffix reflects the one vowel in the stem, before **-ro-* was added, that carried the stress in Pre-Indo-European. The material regarding the Greek stems in -ερος is as follows:

Reduced grade is self-evident in:

κρατερός, καρτερός 'strong' < **kr̥té-* : Eng. *hard*.

γλυκερός 'sweet'. Pokorny (1959:1.222) tentatively derives γλυκύς 'sweet' from **dl̥ḱús*—cf. Lat. *dulcis* 'sweet'—in which case γλυκερός would be analogical, since Pokorny assumes the development of **l̥* to -λυ- is due to the following **-u-*.

διερός 'moist, fresh, active' < **diHé-* : Skt. *dī́yati* 'flies'.

τραφερός 'fat' < **dhr̥bhé-* : τρέφω 'thicken'.

θαλερός 'blooming' < _*dhH̥lé-_ : θάλλω 'bloom' (perf. τέθηλα, Dor. τέθᾱλα = Alb. _dal_ 'sprout' < _*dal-nō_, aor. _doła_ < _*dāl-_.

μαλερός 'mighty, raging' < _*ml̥Hé-_ : Skt. _mr̥nāti_ 'crushes', part. _mūrṇá-_.

κρυερός 'icy' < _*krusé-_ : κρυσταίνω 'freeze', OHG _(h)roso, (h)rosa_ 'ice'.

τακερός 'melting, fluid' < _*tH̥ké-_ : τήκω, Dor. τάκω 'melt'.

φανερός 'visible' < _*bhH̥né-_ : φαίνω 'show' < *φανι̯ω; Skt. _bhā́ti_ 'shines, appears, seems'.

σκιερός 'shady' < _*sk̂iHé-_? Pokorny (1959:1.917–8) connects this with Skt. _chāyā́-_ 'gleam', Goth. _skeinan_, Eng. _shine_, OE _scīr_ 'clear, bright', and reconstructs _*sk̂āi-, sk̂əi-_ : _*sk̂ī-_. The Doric form σκιαρός suggests _*sk̂iHér-_ or _sk̂iHr̥r-_, the latter with antevocalic syllabic _r_. Perhaps this should be connected with Skt. _śyā-vá-_ 'dark brown' and _śyā-má-_ 'black, dark grey, dusky' (_*k̂yeH-_).

βλαβερός 'noxious' appears not to be Indo-European.

δυερός 'unlucky', along with *δυάω (only as Hom. 3. pl. δυόωσι 'afflict with misery') and δύη 'misery' probably belong with δέω, Hom. δεύω, δεύομαι (3. sg. aor. ἐδεύησε) 'lack, suffer want'; so δυερός then reflects _duHé-_. Cf. Pokorny (1959:1.180), who hesitantly connects this group instead with δαίω 'kindle', δᾱλός 'firebrand', etc., reflecting _*dH̥w-_.

Less obvious are the following:

Two forms show -ᾱ- contracted from _*-H̥we-_: to λᾱρός 'pleasant' cf. ἀπολαύω 'enjoy'; and to νᾱρός 'flowing, liquid' cf. νάω, Aeolic ναύω < *σναϝι̯ω 'flow'.

There is most likely restoration of *$_e$ to full grade where a syllabic consonant could not be formed in δνοφερός, ζοφερός 'dark'. The reconstruction of course is very uncertain: Pokorny (1959:1.649; also Szemerényi 1964:401 n.2) suggests _*k^{w}sep-_ (cf. Skt. _kṣáp_ 'night'), but the forms ψέφας, κνέφας 'darkness' and ψεφαρός 'dark' suggest a root-final laryngeal. Similarly there could be restoration of full grade in νοτερός 'damp' and φοβερός, though cognates provide little evidence as to root structure. There is the usual development of _*-l̥He-_ to -ολε-, when _*H_ is _o_-coloring (see Cowgill 1965:147–8; but cf. Bammesberger 1984:27–31), in the substantive χολέρα 'cholera' (cf. χλωρός 'green'), and perhaps also in δολερός 'deceitful' (cf. δόλος 'deceit', δολόω 'deceive'), though the few cognates provide no good evidence for the laryngeal. As χολέρα and χλωρός demonstrate, the vocalism of adjectives and closely related substantives in _-r-_ need not agree, and so although πενθερός 'father-in-law' is often included in this group, it need not be taken as counterevidence—and cf. Lith. _beñdras_ 'mutual'.

On the other hand, as mentioned above, adjectives in -ρος often have full grade in the root. Sure examples are:

λειρώς [for λειρός]· ὁ ἰσχνός καὶ ὠχρός (Hesych.) = Lith. _leĩlas_ 'slender' < _*léy-_ : λιάζομαι 'recoil, shrink', OIcel. _linr_ 'mild'.

πηρός, Doric πᾱρός 'maimed, disabled' < _*péH-_ : ἠπανάω 'be in want', Lat. _patior_ 'suffer, endure'.

σκληρός 'hard, harsh' < _*skléH-_ : σκέλλω 'parch', perf. ἔσκληκα.

βλωθρός 'tall, stately' < _*mléHdh-_ : μέλαθρον 'ceiling, roof', Skt. _mūrdhán-_ 'head'.

It is certain, on the other hand, that among stems in -ρος reduced grade is equally possible in the root: cf. πικρός 'sheep', λυγρός 'mournful', ὑγρός 'moist', etc.

The Greek adjectives in -αρος probably also conform to this analysis, though it is often impossible to say precisely what alpha reflects: it could be _*-H̥-_ or _*-He-_, or perhaps even could result from antevocalic syllabic _r_. So for instance βριαρός 'strong' probably reflects _*g_^{w}_riHé-r-_ (cf. βριάω 'make strong', and OIr. _brīg_ 'strength'), while νεαρός 'young' appears to reflect _*newH̥-r-_ (cf. νεάω 'plough anew', Lat. _novāre_ 'renew').

And so since all adjectives in -ερος have reduced-grade roots, it is rather improbable that such formations are analogical, and they must instead reflect forms that in Pre-Indo-European accented the vowel reflected as -ε- in Greek. In that event it cannot be true, as Kuryłowicz and Szemerényi contend, that _-i-_ is the oldest of Caland's suffixes, since, for instance, κρατερός cannot be derived from the stem κρετι-/κρατι- in Ionic comp. κρέσσων (<*κρετι̯ων) and superl. κρατιστός. And so the basis for the formation of stems with Caland's suffixes must have been the root itself, without _-i-_, and optionally with a final full-grade vowel attached to the root, if that vowel happened to be accented at the time of syncope. There is therefore no good reason on this basis to reject the supposition that the *es*-stems are formed the same way as pre-thematic stems, from stems with columnar accent.

It can be seen now, as well, that the evidence for Brugmann's position does not necessarily conflict with this conclusion. Since the Greek adjectives in -ερος demonstrate that a root-final accented vowel was not necessarily dropped when one of Caland's suffixes was added, very possibly the vowel of the *-es-* suffix originated in such root-final vowels. The suffix then was originally **-s-*, which was added to roots that ended in either a consonant or a vowel. However, forms like *CR̥Ce-s-* were reanalyzed as *CR̥C-es-* (in the same way that, for instance, the weak case-endings absorbed root-final vowels), and **-es-* was then generalized throughout the category, wherever **-s-* followed a consonant. So, for example, **lewk-s-* became **lewk-es-*, as in Skt. *rócas-*, Av. *raočah-* 'light'; but the original form **lewk-s-* had already served to form other stems, and so is preserved as a relic, e.g. in Av. *raoxšna-* 'shining' < **lewk-s-mn-o-*. It is not necessary, at any rate, to assume that the *-es-* suffix ever showed quantitative ablaut alternations within the paradigm. One of the real advantages to assuming the suffix was originally **-s-* is that it obviates the problem of morpheme structure: **es* represents a morpheme structure that is either very rare or, as some believe, nonexistent among PIE roots; and so why should non-root morphemes have it if they, like roots, were once separate words, too? The premises underlying this and the preceding chapter strongly suggest that suffixes beginning with vowels have actually attracted those vowels to themselves from the end of the root, and so consistency in the theory urges that the *s*-stem suffix was originally simply **-s-*. It should be said, too, that beginning from this assumption it is easier to explain *s*-stems in *-is-* and *-us-*, since stems in *-yes-* and *-wes-* almost never occur. How otherwise is one to explain the loss of the full-grade vowel here?

And now the Hittite evidence ought also to be reexamined, since the ablaut in nom. sg. *a-(i-)iš*, gen. *iš-ša-aš* 'mouth' is unexpected if *s*-stems are based on roots with columnar accent. The truth is that Hittite *š*-stems are rather different from *s*-stems in non-Anatolian languages. The four certain *š*-stems are neither adjectival nor based on verbal roots: in addition to *a-(i-)iš* there are *iš-ki-iš* 'back' (dat. *iš-ki-ši*, *iš-ki-ša*), *ne-pí-iš* 'sky' (gen. *ne-pí-ša-aš*), and **ta-pu-uš* 'side' (nominative unattested; dat. *ta-pu-u-ša*), none of which shows quantitative ablaut alternations. Moreover, these are all *is-* and *us*-stems, and the familiar suffix *-es-/-os-*, so much commoner than *-is-* and *-us-* in other IE languages, does not form *š*-stems in Hittite. That *a-(i-)iš* shows quantitative ablaut while the other Hittite *š*-stems do not may be explained if it is assumed that *-š-* in this word is not a suffix—i.e., this is a root-stem that happens to end in PIE **s* (like Lat. *ōs*, *ōris* 'mouth'), and thus shows ablaut. The other three *š*-stems, however, do not have the root structure of root-stems. And so if they really are *s*-stems, why are PIE **-is-* and **-us-* reflected in Hittite, but not **-es-*?

The PIE suffix **-es-* in fact does seem to be reflected in Hittite, in the form of the heteroclitic *-r/n-* suffix *-eššar*, e.g. in nom. sg. *a-še-eš-šar* 'assembly, population', dat. *a-še-eš-ni*. Certainly the *-eššar* suffix is an agglutination, since *-r/n-* is a noun suffix unto itself in Hittite, and a very productive one—productive enough that it should not be surprising if the category of *r/n*-stems has subsumed all PIE *s*-stems. The Hittite *-r/n-* suffix is found in similar agglutinations, e.g. the suffix *-tar-/-nn-* (<**-tn-*), as in *idālawātar*, dat. *idālawanni* 'harm, injury' (cf. *idālu-* 'bad'), and in the suffix *-mar-/-mn-*, as in *ḫilammar*, gen. *ḫilamnaš* 'porch' (cf. *ḫila-* 'enclosure'). The derivational and semantic similarities between the Hittite stems in *-eššar* and the PIE stems in **-es-* are notable: both are largely deverbative (e.g. *a-še-eš-šar* : *eš-* 'sit'; *pár-ḫi-eš-šar* 'haste' : *parḫ-* 'pursue, drive'; *ḫa-an-ne-eš-šar* 'lawsuit' : *ḫanna-* 'litigate, decide a lawsuit', etc.); and those that are not deverbative are largely abstract nouns based on adjectives—cf. Skt. *váras-* 'breadth' : *urú-* 'broad'; *ójas-* 'strength' : *ugrá-* 'strong'; Gk. τάχος 'quickness' : ταχύς 'quick' (note that this group shows extensive alternation of Caland's suffixes); Hitt. *palḫeššar* 'breadth' : *palḫi-* 'broad'. A striking instance is Hitt. *parku-* 'high' beside *parkeššar-* 'height': if *-eššar* really is an extension of PIE **-es-*, then this is a Caland's suffix alternation precisely parallel both formally and semantically to ταχύς : τάχος, etc.

Thus all the evidence that PIE *s*-stems originally showed ablaut alternations like those of other athematic classes is unreliable, and there is no obstacle to assuming that the stems are very similar in origin to thematic stems: they are based on originally non-ablauting paradigms. The similarity is even such that the *-s-* suffix is associated with a specific gender, like the *ā-* and *o*-stems, and unlike the *i-*, *u-*, *r-*, and *n*-stems. This conclusion renders it considerably easier to understand the relationship of the suffix *-es-* to Caland's suffixes, a relationship unique among the stem-forming suffixes of consonant-stem nouns.

CHAPTER FOUR: CONJUGATION

4.0. THE PROTO-INDO-EUROPEAN CONJUGATIONAL SYSTEMS. The ablaut patterns of IE verbs suggest that only the present and aorist systems date from the time of syncope. Even if there was a fully-developed future system in Proto-Indo-European, it would necessarily be a post-syncopic innovation: e.g., Skt. 1. sg. fut. *dāsyā́mi*, Gk. δώσω, and Lith. *dúosiu* 'give' are all thematic formations with strong roots, and such stems with two full-grade vowels cannot have undergone syncope as such. The perfect system, though older, is even more innovative. Singular forms regularly contain three full-grade vowels, e.g. Gk. 3. sg. λέλοιπε (λείπω 'leave'). Full grade in the singular endings is particularly surprising, given the example of the present and aorist systems, where the active singular endings are in weak grade; and the Hittite *ḫi*-conjugation shows the same peculiarity as the IE perfect, since the endings *-ḫi*, *-ti*, *-i* apparently reflect **-ḫai*, **-tai*, **-ai*.[1] The accent and ablaut of the Vedic 3. plural are also difficult to explain—

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[1] See Rosencranz (1952:344–5), and Jasanoff (1979:80), the latter with references. The problem is that *-ti* cannot be original, as otherwise it should have become **-zi*, as did the 3. sg. present ending of the *mi*-conjugation. Kerns and Schwartz (1972:11) attribute the nonassibilation to the intervention of a laryngeal (**-tHe*), but then the nonassibilation in *ḫi*-conjugation forms like 3. sg. *š(i)panti* (stem *š(i)pant-* 'pour a libation to') must be explained as due to analogy, which is difficult in view of the assibilation in the iterative form *š(i)panzake-*. Moreover, the 3. sg. ending *-i* does appear occasionally as *-ai* (Friedrich 1960–67:1.79).

e.g., there is no full-grade vowel in either the root or the ending of *ruruhúr*, root *ruh* 'ascend' (assimilated from **le-ludh-*: see Leumann 1968:54)—and in fact the *-r* ending apparently is not an Indo-Iranian innovation, in the light of Hittite *-er* in the preterite of the *ḫi*-conjugation. Iterative syncope unfortunately sheds no light on the origins of the future and perfect systems, nor on the much-discussed relationship between the Hittite *ḫi*-conjugation and the IE perfect. Only the present and aorist systems reflect well the results of syncope, showing in any given form of the most conservative types of verbs a single full-grade vowel, accented in Vedic Sanskrit.

Imperative and subjunctive formations both originated after syncope. For the imperative, compare Skt. 2. sg. pres. *i-hi* (*i* 'go') and *vid-dhi* (*vid* 'know') to Gk. aor. ἴθι and ϝίσθι. It seems unlikely that such words should have carried no accent at the time of syncope, and so they must be post-syncopic innovations. On the other hand, the subjunctive is formed by adding theme vowel plus ending to the stem, regardless of whether the stem is already thematic, e.g. athematic 1. sg. **es-o-He* (Skt. *ásā[ni]*, Lat. fut. *erō* 'be'), 2. **es-e-s(i)* (Skt. *ásasi*, Lat. *eris*), etc., and thematic 1. sg. **bhere-o-He* (Gk. φέρω, Skt. *bhárā[ṇi]* 'bear'), 2. **bhere-e-s(i)* (Skt. *bhárāḥ*), etc. Both the imperative and the subjunctive forms then seem to have been created after the morphologization of quantitative ablaut.

The effects of syncope may be traced in a variety of conjugational categories, including some middle, injunctive, and optative forms, but nowhere more clearly than in the present active indicative of athematic verbs. Here each form will usually have a single full-grade vowel, whose place will correspond to the place of the accent in Vedic Sanskrit, where the pattern dictates accented stems in the singular, and desinential accent elsewhere, e.g. 1. sg. *émi* 'go' (<**[H]ey-mi*) : 1. pl. *imási*, *imáḥ* (<**[H]i-més[i]*). That the present active indicative should show the effects of syncope better than most other categories should not be surprising, since the unmarked character of this category speaks in favor of its relative antiquity: for instance, the subjunctive, a marked category with respect to the indicative, is in fact based historically on the indicative.

The evidence indicates that some athematic verb stems were formed after apocope, and others before. So for example Sanskrit thematic presents of the sixth class (according to the classification of the ancient grammarians) represent a very old type, formed before apocope, e.g. *rujáti* 'breaks' < **luĝét(i)* < **làwaĝá-t(a)*. On the other hand, a root-class present like *dvéṣṭi* must derive from a stem formed after the application of apocope (**dwéyst[i]* < **dawáyas-t*). It will be shown below (§4.4) that the distribution of apocopated and nonapocopated stems is not random, and the chronological difference between the two formations has a straightforward motivation in the circumstances that gave rise to the distinction between the present and aorist systems.

4.1. ACTIVE INFLECTIONS OF THE PRESENT AND AORIST SYSTEMS.

The personal endings of the present and aorist systems are generally thought to have been separate words at one time. The most popular view, dating at least from the time of Franz Bopp, is that they reflect personal pronouns. For a discussion of this and other possibilities, see Szemerényi (1980:302–5). The conjugational pattern of accent and ablaut then indicates that before syncope the words that became the singular endings were atonic clitics, producing no effect on the accent of the stem, while the words that became the plural endings were nonclitics, and bore the primary word stress after the operation of the law of polytony (§3.1).

The dual endings are usually regarded as a late development in Proto-Indo-European. Watkins (1969:46), for instance, as remarked above (§2.1), notes that the fact of the derivation of all IE dual pronouns from plural ones discourages the assumption of any real antiquity to the dual category, and he assumes that dual conjugational endings were formed from the plural ones either at the dialectal level or at the end of the predialectal period. The dual endings may at any rate be disregarded without detriment to the body of evidence concerning accent and ablaut, since the pattern in the dual is consistently the same as in the 1. and 2. plural.

The remaining endings show 'primary' and 'secondary' forms, the indicative use of the former being in the present tense, and of the latter in the imperfect and the aorist. The primary endings in the active singular are generally reconstructed as 1. **-mi*, 2. **-si*, 3. **-ti*, and the 3. plural as **-nti*; the secondary endings lack the final *-i*, but are otherwise identical to these. It would be difficult to explain the loss of final *-i* in the secondary endings, and so consensus opinion has it that the primary endings are derived from the secondary by the addition of an element *-i* of 'dubious' etymology (Kuryłowicz 1964:131), usually considered a deictic particle (see, e.g., Neu 1967:225; Kerns and Schwartz 1972:4; Burrow 1973:308; and Jasanoff 1979:83). The terminology 'primary' and 'secondary' is thus somewhat confusing from a historical point of view.

The distinguishing feature of primary endings, however, is not consistently a final *-i*. For instance, the Greek athematic primary endings are sg. 1. -μι, 2. -σι, 3. -τι, pl. 3. Dor. -ντι, while the endings of the 1. and 2. plural (not distinguished from the secondary endings) are -μες/-μεν and -τε. The Baltic and Slavic endings correspond to the Greek (except that Baltic has lost the 3. plural ending), and once again the 1. and 2. plural secondary endings are identical to the primaries. In Indo-Iranian, too, the primary 2. plural ending is *-tha*, and the secondary *-ta*, reflecting no final PIE **-i*, while the primary 1. plural ending *-mas* (cf. secondary *-ma*) may optionally be extended by *-i*—very probably a late development, since *-i* is not optional in other primary endings. Only in Anatolian are the primary and secondary endings consistently distinguished (though not solely distinguished) by the presence or absence of *-i*. These facts suggest that the original method of distinguishing the two sorts of endings was not simply the addition of *-i* to all endings: it would be difficult to explain the loss of *-i* in the 1. and 2. plural (as well as the dual), while the Anatolian situation may readily be attributed to paradigm regularization.

Syncope provides an explanation for the distribution of *-i* in the primary endings, since *-i* appears only in forms that would otherwise end in clusters of two or more consonants. Without this *-i*, some forms would be difficult or impossible to pronounce, except before vowels in external sandhi, e.g. sg. 1. **yewdh-m* (formed after apocope, so **yewdh-m̥* would be incorrect until syllabicity of resonants came to be conditioned by phonological environment), 3. **yewddh* < **yewdh-t* (cf. Vedic 2. sg. *yótsi* 'fight'). The *-i* then was added essentially as a prop vowel, and of course that is why it is not found in the 1. and 2. plural endings (nor in the dual), which involve no final consonant clusters. This argument is not reversible: it would be peculiar for final *-i* to have been lost in the 1. and 2. plural simply because it was not required here as a prop vowel. Assumption of such a loss would require formulation of an *ad hoc* morphophonological rule that created paradigm irregularities.

That these clusters really might pose a phonological problem is amply demonstrated by the developments of the secondary endings in various IE languages. For example, the 2. and 3. singular endings are as often as not dropped from Vedic root-aorists (e.g. 3. sg. *agan* 'went' < **e-gʷem-t*), and they are always dropped from *s*-aorists; and final *-t* is dropped from the 3. plural ending in both Sanskrit and Greek. Such clusters in fact appear to be the reason athematic conjugation with secondary endings came to be limited to so very few verbs in Greek—significantly, only originally athematic verbs with stems ending in vowels after the loss of laryngeals and medial sigma carry these endings.[2] So for instance the aorists ἔγνων 'knew', ἔφῡν 'begot', ἔβην 'went', etc., reflect the original PIE ending **-m*, while root-aorists to consonant stems, like Vedic *áśravam* 'heard' (<**eḱlewm̥* < **eḱlew-m*) are not found in Greek—cf. Gk. thematic aor. ἔκλυον (=post-Vedic *śruvam*). It is difficult to explain why these endings are distributed in Greek on a *phonological* basis unless it is assumed that PIE forms like **eḱlew-m* have been (almost entirely) lost in Hellenic, and the elimination of final consonant clusters is perhaps the best explanation for that loss.

Like many phonologically-motivated innovations, the addition of *-i* eventually assumed a morphological function, distinguishing tenses, and so *-i* spread to the middle endings of the primary tenses—apparently at first only to the corresponding persons and numbers (e.g. Arcadian-Cypriot sg. 2. -σοι, 3. -τοι, 3. pl. -ντοι : secondary -σο, -το, -ντο respectively; cf. primary and secondary 1. pl. -μεθα, 2. -[σ]θε), but eventually to all middle endings in some languages, e.g. in Anatolian and Indo-Iranian (Skt. 1. pl. *-mahe*, 2. *-dhve*, and 1. dual *-vahe*, etc.). The restriction of *-i* to primary endings is also a result of the element's assuming a morphological function, considering presents and aorists originally had the same endings, and so final consonant clusters must have posed difficulties in both categories. But the need for the prop vowel was greater in the present system since, as mentioned above, apocopated stems were used in the present system but not the asigmatic aorist system, for reasons explained below (§4.4). As a result, some present forms ended in triconsonantal clusters (like *dvéṣṭi* above), while asigmatic aorist forms never ended in more than two consonants.

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[2] True exceptional asigmatic aorists like Hom. ἀνένεικα and Ion. εἶπα, with their related forms, are never found with athematic secondary 2. or 3. singular endings—see the discussion of such forms below (§4.2.1). The elimination of primary athematic inflection in Greek nonvocalic stems was perhaps to a great extent induced by the elimination of the corresponding secondary formations, though no doubt the developments of internal consonant clusters are also to be reckoned with.

The 3. plural ending raises particular difficulties of analysis, as the full-grade vowel in a form like Vedic *sánti* 'they are' (<**s-e-nti*) seems to belong neither to the stem nor the ending. The ending is certainly *-nt-* rather than ***-ent-*: otherwise, for instance, the corresponding subjunctive ending would be ***-ēnt-* (<**-e-ent-*) rather than **-e-nt-*, the latter being the ending actually reflected in subjunctive forms like Vedic *ásan* (<**es-e-nt*: cf. 2. sg. sj. *ásasi* < **es-e-si*, 3. sg. *ásati* < **es-e-ti*, etc.), and in the corresponding subjunctive middle forms, as with Vedic *hánanta* to the root *han* 'strike'. So also thematic verbs end in **-o-nt-* rather than ***-o-ent-*, e.g. Vedic 3. pl. indic. *bháva-nti* 'be' (cf. 2. sg. *bháva-si*, etc.). But nor can the full-grade vowel in **s-e-nti* very readily be said to belong to the stem, since this assumption would render the 3. pl. stem the only thematic stem in an otherwise entirely athematic paradigm (as pointed out by van Wijk 1905/1906:49). The vowel is accented in Vedic Sanskrit, and so doubtless original. Therefore the 3. plural seems to have stood apart from the rest of the paradigm from the very beginning. That impression is reinforced by the observation that the 3. plural ending clearly is not of pronominal origin (Szemerényi 1980:303–4, for instance, seems to agree, though he accepts the pronominal origin of most other present-tense endings), and is widely believed to be identical to the element _-nt-_ found in present participles.[3] If that is so, then although the synchronic position of the connecting vowel in the inflectional system is still uncertain, its origin is no longer mysterious, according to the analysis set forth here. Although some athematic verbs did not acquire endings until after apocope, athematic declensional stems were inflected before apocope. Therefore, participial stems in Pre-IE _*-á-nata-_ (to become _*-ent-/-ont-_ after syncope), perhaps already in existence when endings were first added to verbs, were appropriated for use in the third person plural.

The affinity between the 3. plural and the present participle is especially apparent when ablaut variations are taken into consideration, since the two always share the same stem in Vedic Sanskrit. For instance, all athematic present classes have _-a-nt-_ in both stems, except the reduplicated presents, which have reduced-grade _-at-_ (<_*-n̥t-_) in both. In the thematic and root-aorists, which have participles like those of the present (for reasons made clear below, §4.2.1), the participial and 3. plural suffixes agree as regards ablaut; and this is particularly remarkable in the root-aorists, where the 3. plural represents the only weak-grade stem in its own paradigm, e.g. 3. pl. _ákran_ (root _kr̥_ 'make'), part. _kránt-_ : 1. pl. _ákarma_, etc. The same affinity is observable in Avestan cognates (Bartholomae 1894:98), though paradigm regularization has obscured the relationship in other languages. However, OIcel. _stund_ 'length of time' (=OE _stund_, OS _stunda_, OHG _stunta_) perhaps derives from a participle with weak-grade suffix, to an originally reduplicating verb _*sti-stH-n̥t-_. The reduplicated present has been thematized already in Vedic, but Gk. ἵστημι 'stand' is still athematic.

Hittite verbs with quantitative ablaut corroborate this connection between the 3. plural and the present participle. Just one of these, _kuen-_ 'strike, defeat, kill' (=Skt. _han-_,

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[3] As argued by Brugmann (1897–1916:2.1.455); see also Kieckers (1934:11–31) and Vaillant (1936:106). T. Burrow also envisages a correspondence with the participial ending, and makes the interesting remark that the alternation between the 3. plural endings _-r_ and _-nt_ in Indic and Hittite 'is reminiscent of the alternation found in nominal stems between _r_ and _n/nt_: Gk. ὕδωρ, ὕδατος, etc.' (1973:318).

Gk. θεν-) is well attested in the plural, but its paradigm suggests a weak-grade root only in the 3. plural *kunanzi*, as against 1. pl. *kuennummeni* and 2. pl. *kuenatteni*. Likewise in the imperative Hittite has 3. pl. *kunandu*, but 2. pl. *kuenten*; and cf. the participle *kunant-* (Friedrich 1960–67:1.82-3). This situation is entirely analogous to that in the Vedic root-aorists.

4.2. THE AORIST SYSTEM. The following is the account of the rise and development of the aorist system provided by Kerns and Schwartz (1972:5–6): The aorist came to be differentiated from the present at a very early date, before the present stems came to be widely 'characterized', i.e. before they acquired suffixes, infixes, or reduplication. So for instance at a time when the bare root **ĝhew-* 'pour, sacrifice' served as the present stem, the aorist was formed from this (as in Vedic 2. sg. aor. *hó-ṣi*); subsequently the present stem came to be characterized in various ways, and the form of the present employing the bare root was lost, leaving a variety of characterized presents: reduplicated Skt. *juhóti* 'sacrifices', thematized Gk. χέω 'pour', suffixed Goth. *giutan* 'pour', etc. As the present stems came to be characterized, preterites continued to be formed from the new present stems by the use of secondary endings (and perhaps the augment: see below), and the new characterized preterite formations came to stand in opposition to the older uncharacterized ones to the same roots. The formal difference was exploited, the older uncharacterized secondary stems coming to serve as aorists, and the new, characterized ones as imperfects. So useful was the distinction between aorist and imperfect that as new verbs entered the present system, there arose a need for corresponding aorists. The original method of forming aorists was no longer feasible, since uncharacterized roots were not readily derivable from such new stems, and so new ways of building the aorist stem were established: reduplicated and sigmatic aorists are of this later type. Modifications of Kerns and Schwartz' account will be necessary, as shown below, but this may be taken as a working hypothesis.

It is disputed whether the augment is a PIE development, or whether it is a post-PIE innovation that never spread beyond a small group of dialects.[4] The dispute is of limited relevance here, since the detailed phonological information necessary to determine the original distribution of aorist types, which is the aim of the following pages, is to be found almost solely in Greek and Indo-Iranian; and therefore the augment must be reckoned with in reconstructions. At the same time, however, since it is general opinion, the position is adopted here that the augment is not a very archaic feature. The best evidence for this position is the pattern of accent and ablaut associated with the augment in Vedic Sanskrit. If there is a word accent, the augment is always accented, though there is almost always a full-grade vowel elsewhere in the word. When an aorist is unaugmented and accented, the accent almost always falls on a full-grade vowel. And so it seems that the augment was a discrete word until relatively recent times, when it was attached to the stem, the augment's accent then assuming the role of word accent. Aorists then represent at least two different stages of word-combining: e.g., Gk. 1. pl. ἔθϵμϵν 'place' reflects *é+dhH̥mé(n)*, while the second element of that group itself represents an earlier combination of root and non-clitic pronoun, joined before the application of syncope. (Whether **H̥* actually can give ϵ in Greek rather than α, or whether the second ϵ in ἔθϵμϵν is analogical, is immaterial: only the Abstufung matters here. The problem of the triple representation of PIE **H̥* in Greek is discussed *in extenso* by Lindeman 1982.)

According to Kerns and Schwartz' account, then, root-aorists are the oldest type, and so these will be examined first.

4.2.1. *Root-aorists and thematic aorists.* It has not perhaps been pointed out that root-aorists and thematic aorists are distinguished not solely on the basis of the presence or absence of the theme vowel, but also by root consonantism. Most root-aorists in Vedic Sanskrit reflect roots of the structure *CeC-*, but even those with triconsonantal roots generally assume the form *CCeC-* rather than *CeCC-*. Conversely, the roots of Vedic thematic aorists, which are in weak grade throughout the indicative, are almost invariably triconsonantal—these roots are typically of the form *CR̥C-*, almost never *CeC-* < *C*$_e$*C-*. The roots are listed in Tables 4.2.1a and b, where type I represents the structure *(C)CeC-*, and type II the structure *CeCC-* (in the root-aorists) or *CR̥C-* (in the thematic aorists); the roots are listed in full grade for the root-aorists, but in their normal dictionary form for the thematic aorists.[5] The classification of a few roots is in doubt, due to the loss of laryngeals. The status of the root *tan* is ambiguous, since it is reflected as both a heavy and a light base. Perhaps *tan* as a root-aorist is unextended by a laryngeal (as in *tanóti* 'stretches', part. *tatáḥ* = Gk. τατός, Lat. *tentus*), but as a thematic aorist does reflect a form with a final laryngeal (as in *tani-man-* 'thinness', Lith. *tìnti* 'swells'). The root *tam* among the thematic aorists, however, certainly reflects a form with a final laryngeal: cf. Skt. *tāṁtáḥ*, *támitoḥ*. The roots *āp* and *bhū* show little or no ablaut variation.

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[4] For references see Szemerényi (1980:279 nn. 4–9). The languages that reflect the augment are Indo-Iranian, Greek, Phrygian, and Armenian; and Eichner (1975:78) suggests there are traces of it in Hittite.

As the tables show, the root-aorists are preponderantly made up of the root type *(C)CeC-*, though *CeCC-* is also well root-aorists, type I (41)

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[5] Included in the list of root-aorists are only those attested in the moods and voices that regularly show consistent full grade of the root—i.e. the active indicative (excluding the 3. plural), the active subjunctive, and the active injunctive. This limitation has been necessary because if a root of the form /CRC/ is attested only in the weak grade, it is difficult to say for certain whether the full-grade form should be *CReC-* or *CeRC-*. As a consequence of this limitation, only the roots attested in the corresponding parts of the aorist system are used for the thematic list, as well. Excluded from the list of type II root-aorists are roots attested in full grade only as passive indicatives, since this formation, appearing only in the 3. singular, is apparently an Indo-Iranian innovation, and almost certainly is etymologically unrelated to the PIE aorist system. To include the passive indicative forms would skew the proportions in the table, since there are no thematic passives; but more important, the nonexistence of thematic passives points to the conclusion that both thematic and root-aorist stems (the former dethematized) are represented among the passives. As might be expected, then, exclusion of the passives has a substantial effect on Table 3.2.1a, since they would add seventeen roots to the list of type II root-aorists. All the information in the table derives from MacDonell 1910.

kar 'make'
gam 'go'
gā 'go'
grabh 'seize'
ghas 'eat'
ce 'note'
jan 'generate'
jñā 'know'
tan ? 'stretch'
tap 'heat'
dar 'pierce'
dagh 'reach'
dā 'give'
dā 'bind'
dhā 'place'
naś 'obtain'
pad 'go'
pā 'drink'
prā 'fill'
bhar 'bear'
man 'think'
mā 'measure'
yam 'reach'
yo 'separate'
vac 'speak'
var 'choose'
var 'cover'
vah 'carry'
śro 'hear'
śre 'resort'
sagh 'be equal to'
sad 'sit'
sā 'bind'
so 'press'
star 'strew'
sto 'praise'
sthā 'stand'
spar 'win'
hā 'leave'
he 'impel'
ho 'sacrifice'

root-aorists, type II (23)

krand 'cry out'
cet 'perceive'
ched 'cut off'
joṣ 'enjoy'
tard 'split'
darś 'sce'
parc 'mix'
bhū ? 'be'
bhe (*bhī*) 'fear'
bhed 'split'
bhrāj 'shine'
manth 'stir'
mok (*muc*) 'release'
myakṣ 'be situated'
yodh 'fight'
rādh 'succeed'
roj 'break'
rodh 'obstruct'
vark (*vr̥j*) 'twist'
vart 'turn'
śās 'order'
skand 'leap'
ho (*hū*) 'call'

Table 4.2.1a. Roots that form root-aorists in Vedic Sanskrit.

attested. Of the thematic aorists, however, just thirteen are of the type *(C)CeC-*, while 44 have the structure *CR̥C-*. Moreover, most of those thirteen must be disregarded, as they are transfers from the root-aorist class: MacDonell (1910:371 and n. 6) thus designates *r̥*, *kr̥*, *khyā*, *gam*, *dā*, *dhā*, *vyā*, *sthā*, *hi*, and *hvē*.[6] This leaves just three roots not of the type *CR̥C-* that form thematic aorists: *sad* and *sr̥* are undeniable,

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[6] I am not certain I agree that *khyā* and *vyā* are transfer forms, especially since they are not attested in other aorist classes in the Vedas. However, neither of them is an Indo-European root. On the other hand, all the other roots regularly form root-aorists, their thematic forms being quite exceptional, and so they are certainly transfers.

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thematic aorists, type I (13)

r̥ 'go'
kr̥ 'make'
khyā 'see'
gam 'go'
dā 'give'
dhā 'place'
vyā 'envelop'
śak 'be able'
sad 'sit'
sr̥ 'flow'
sthā 'stand'
hi 'impel'
hvā (*hū*) 'call'

thematic aorists, type II (44)

āp ? 'obtain'
kr̥t 'cut'
kra(n)d 'cry out'
kram 'stride'
krudh 'be angry'
kṣudh 'be hungry'
guh 'hide'
gr̥dh 'be greedy'
grabh ? 'seize'
chid 'cut off'
ta(ṁ)s 'shake'
tan ? 'stretch'
tam 'faint'
tr̥p 'be pleased'
tr̥ṣ 'be thirsty'
tr̥h 'crush'
dā̆s 'waste'
dr̥p 'rave'
dr̥ś 'see'
dhr̥ṣ 'dare'
dva(ṁ)s 'scatter'
nij 'wash'
bhū 'be'
bhra(ṁ)s 'fall'
muc 'release'
ra(n)dh 'subjugate'
riṣ 'be hurt'
rud 'weep'
rudh 'obstruct'
ruh 'ascend'
vid 'find'
vr̥j 'twist'
vr̥t 'turn'
vr̥dh 'grow'
śiṣ 'leave'
suc 'gleam'
śram 'be weary'
śriṣ 'clasp'
śru ? 'hear'
san 'gain'
sic 'pour'
sr̥p 'creep'
sra(ṁ)s 'fall'
sridh 'blunder'

Table 4.2.1b. Roots that form thematic aorists in Vedic Sanskrit.

while *śak* is uncertain (PIE **k̑Hek-*? Pokorny [1959:1.522] reconstructs PIE **k̑ak-*). More illustrative than the figures themselves is an examination of the tables, which reveal clearly that all the most familiar Vedic biconsonantal roots belong to the root-aorists, while except for the transfers, biconsonantal roots are almost entirely missing from the class of thematic aorists.

And so the number of exceptions is so small as to be almost negligible, and it can be stated as a general rule that biconsonantal roots take full grade in the aorist, while triconsonantal roots may or may not take weak grade. But this rule can be further refined, since it is clear from Table 4.2.1a that triconsonantal roots of the form *CCeC-* (thème II roots in the terminology of Benveniste 1935, as opposed to thème I *CeCC-*) may form root-aorists, while it seems they do not form thematic aorists. This is difficult to prove conclusively, since the roots of thematic aorists are always in weak grade, and so technically could represent the reduction of either thème I or thème II roots. However, every root listed under type II in Table 4.2.1b is attested in thème I form in categories other than the aorist where the root is in full grade, with the sole exception of *śru* 'hear'. Moreover, the counterevidence of *śru* is immaterial, since the root is well attested as a root-aorist in the Vedas, while the evidence for a thematic aorist is questionable (the question mark in the table reflects Whitney's own reservation), founded on a single attestation in a post-Vedic text. It is true that a few of these roots are attested in both thème I and thème II forms in categories outside the aorist, but still the thème I forms are invariably much commoner. And so it is justifiable to say that in all probability not only biconsonantal roots, but also thème II roots form root-aorists and not thematic aorists, while thème I roots may form either type.

But perhaps even this generalization ought further to be refined. Pure symmetry suggests that if biconsonantal roots form only root-aorists, and if only thème I triconsonantal roots form thematic aorists, then the type II root-aorists in Table 4.2.1a are somewhat anomalous. Were it not for these, it could be said simply that root-aorists are made only from type I roots, and thematic aorists only from type II. The considerable disparity in the number of type II roots in the two tables raises further suspicion, as does the fact that quite a few of the type II roots in the first table are also listed in the second, suggesting perhaps that these are transfers, like nearly all the type I roots in the second table.

The Greek evidence tends to support the assumption that type II roots did not form root-aorists in Proto-Indo-European. The evidence is not conclusive, since a great deal of thematization has affected the root-aorists in Greek, with the result that it is sometimes not possible to say for certain whether a Greek thematic aorist does not in fact reflect a PIE root-aorist. In several instances, however, the thematized stem preserves a root in full grade (beside forms in weak grade), thus clearly indicating an original root-aorist. In these instances the roots are always of type I, e.g. Att. inf. θενεῖν (to θείνω < *θεν-y̯-ω 'strike'), Hom. 3. pl. mid.

ἀγέροντο (to ἀγείρω 'collect': cf. 3. sg. mid. ἤγρετο < **e-Hgr-* or **-n̥-gr-*) and Hom. and Att. ὤφελον (to ὀφείλω 'owe', beside Att. ὦφλον, also in Herodotus, to ὀφλισκάνω). There are eleven such original roots (listed by Schwyzer 1939–50: 1.746–7), and the one apparent exception to the rule (3. sg. mid. πέρθετο, to πέρθω 'sack, ravage') Schwyzer suggests is analogical to aor. inf. πέρθαι. This is almost certainly correct: cf. the normal aorist ἔπραθον in Homer; and πέρθαι itself is perhaps to be explained as sigmatic (*περθ-σ-σθαι: Cunliffe 1924:323). Forms like Hom. 3. sg. ἔκτα (for *ἔκτεν < **-en-t*, to κτείνω 'kill') Schwyzer explains as due to the influence of forms like ἔκταμεν, since apparently weak grade in the plural is etymological, as discussed below. The thematic aorists with omicron in the root that Schwyzer lists are actually in weak grade, showing the normal development of *-R̥He-* in Greek when **H* is *o*-coloring (see Cowgill 1965: 147–8), e.g. Hom. 3. sg. ἔθορε (to θρώσκω 'leap') and 3. sg. sj. μόλῃ (to βλώσκω 'go').

In addition there are several actual relic athematic aorist forms that have not been thematized, and these also are never of type II. The root is always in weak grade, as these are generally middle forms (listed by Schwyzer, p. 740). Such are Hom. 3. sg. mid. ἔχυτο (to χέω, χεύω 'pour'), 3. sg. mid. ἔσσυτο (to σεύω 'set in motion' < **kyew-*: cf. Att. [επί-]σσυτος = Skt. *cyutáḥ* 'deserted') and Κλύμενος proper name, part. to κλέ(ϝ)ω 'glorify'. There is also a small number of aorists with -α- between root and ending: these roots end in consonants, and so the vowel is usually explained as originating in the 1. singular, where **-m̥* gives -α, and spreading to other persons and numbers (Schwyzer, pp. 744–6). Such for instance is part. σευάμενος beside archaic ἔσσυτο (above). These also are all roots of type I: Ionic 1. sg. εἶπα 'said' does not belong here, since it is actually a reduplicated aorist, from **e-we-w(e)k^w-*: cf. Vedic *ávocat* and Gortynian προ-ϝειπάτω (with dissimilation? Brugmann 1897–1916:2.3.112). Hom. ἤνεικα (suppletive aorist to φέρω 'bear'; cf. Vedic 3. pl. aor. *áneśan* to *naś* 'attain') is unclear, especially next to the corresponding Attic ἤνεγκα, and is much disputed (for references see Boisacq 1938:251–2). Cognates suggest the PIE root was **Hneḱ-*: cf. Skt. *aśnóti* 'attains' (<**Hn̥ḱ-new-*), perf. *āmáṁṣa* = OIr. *-ānaic* (<**ōnonḱe* or **ānonḱe*, perhaps **HeHnonḱe* metathesized from

**HenHonk̑e*). Several Greek forms reflect the root as **Hnek̑-*, e.g. δουρ-ηνεκής 'a spear's cast away' (from the sense *'as far as one can reach with a cast spear', Pokorny 1959:1.317) and κεντρ-ηνεκής 'driven on'. Various forms in the paradigm of ἤνεικα/ἤνεγκα also suggest original **Hnek̑-*, e.g. pass. aor. ἠνέχθην and perf. κατ-ήνοκα, the latter seeming to reflect **-He-Hnok̑-*. And so if ἤνεικα and ἤνεγκα do replace an earlier *ἤνεκα, regardless of the method of and reason for the change, this form does not violate the pattern of roots of the form *(C)CeC-* in the root-aorists. One authentic exception appears to be Hom. 1. sg. ἔκτη(ϝ)α (to καίω 'kindle'), which appears to reflect **e-k̑eHw-*. But in fact the root is probably not Indo-European: the only cognates outside of Hellenic that Pokorny (1959:1.595) can suggest are Lith. *kūlěti* 'suffer grain blight' and *kūlě* 'grain blight', which are formally and semantically distant.

The only other aorist stems that have not been thematized are those that originally ended in postvocalic laryngeals, and of these Schwyzer lists twenty-two, e.g. ἔστην (to ἵστημι 'stand'), ἔβην (βαίνω 'go'), and ἔγνων (γιγνώσκω 'know'). These of course all represent type I roots.

On the other hand, the commonest Greek thematic aorists (Schwyzer lists seventy-nine, pp. 747–8) employ triconsonantal roots in weak grade, as in Indic, almost consistently corresponding to the structure *CeCC-* of the same roots in other inflectional categories, e.g. 1. sg. mid. ἐπυθόμην (to πεύθομαι, πυνθάνομαι 'ask') and 1. sg. ἔφυγον (to φεύγω 'flee'). Just three of these seem to be exceptions to the pattern seen in Indic that such forms correspond to thème II roots in full-grade forms: they are ἔτραπον (τρέπω 'turn'), ἔτραφον (τρέφω 'make firm') and ἔδραμον (cf. perf. δέδρομε, suppletive to τρέχω 'run'). There are no Indic aorists to these roots, and they might represent thematizations (starting from the 3. plural) of root-aorists: that is perhaps the best way to account for the coöccurrence of τρέπω and τρέχω with Doric τράπω and τράφω, assuming these are based on the singular and plural (respectively) of the root-aorists, in the same way that some presents in -έω seem to be based on thematic aorists (see Schwyzer, p. 682 et passim). Four other roots appear to be type I roots in weak grade rather than the expected full grade: they are σχ-ε- (Hom. inf. σχεῖν to ἔχω 'have'), σπ-ϵ- (3. sg. ἔνισπε, to ἐννέπω 'tell'), πλ-ϵ- (3. sg. mid. ἔπλετο, to πλέω 'become'), and πτ-ϵ- (Attic 1. sg. mid. ἐπτόμην, to πέτομαι 'fly'). But the last of these, at least, is actually a heavy base: cf. poetic active ἔπτην (to *ἵπτημι), which makes ἐπτόμην the correct aorist to πέτομαι. The other three in fact also appear to be heavy bases: to σχεῖν cf. fut. σχήσω; to ἔνισπε cf. fut. ἐνισπήσω; and to ἔπλετο (<_*e-k_^{w}_l-_) cf. Skt. _cárati_ 'goes', inf. _cáritum_, part. _cīrṇáḥ_.

And so the evidence of Greek second aorists corroborates the Indic evidence that in Proto-Indo-European, type I roots formed only root-aorists, and only type II roots formed thematic aorists; and the Greek evidence further suggests that originally, type II roots never formed root aorists. If the aorists under type II in Table 4.2.1a are in fact an Indic innovation, a specific model and motivation for their creation can be found in the Vedic passive aorist, since this is always athematic—see the discussion below (§4.3.1), with examples. And so it can certainly be stated as a general rule that biconsonantal roots must take full grade in the aorist (that is, in the indicative singular), and there is good reason to think that this statement can even be strengthened to include the claim that originally root-aorists always had the form _(C)CeC-_, never _CeCC-_. Another, more obvious complementary distribution is that full-grade roots invariably form athematic aorists, while weak-grade roots form thematic ones. Neither of these two complementary distributions is by itself exceptionally surprising, but the coöccurrence of these two regularities poses some problems of explanation. There is, however, an explanation that will account for both at once, and that explanation relies on the theory of iterative syncope. Since both the thematic and athematic aorists have a single full-grade vowel in any given form (once the augment is factored out), it may be assumed that at the time of syncope the root vowel carried the accent in the athematic type, e.g. _*é g_^{w}_éHm_ > Skt. _ágām_, Gk. ἔβην, but _*é dr̥k̂óm_ > _ádr̥śam_, Gk. ἔδρακον. The accentuation of unaugmented aorists in Vedic confirms the association of the place of the accent with the one full-grade vowel (MacDonell 1910:371). Why the former should have carried the accent on the root and the latter on the theme vowel is explicable if there is assumed a shift of accent to the last vowel in the word shortly after the first stage of syncope: after **dárak̂àm* is reduced to **dárk̂àm*, the accent shifts, giving **dàrk̂ám* > ***d_e*rk̂óm*; but after **gʷáHa-m* is reduced to **gʷáHm*, no shift of accent is possible. Therefore every root that originally accented the vowel immediately before the last consonant of the root had no accent shift, and this explains why it is not only biconsonantal roots but also roots of the form *CCeC-* (e.g. Vedic 2. sg. *áśreḥ* 'resorted' < **é k̂léy-s*, etc.) that are athematic. The process is quite regular in the singular, as demonstrated by the sample Vedic paradigms in Table 4.2.1c. Not all the forms given are actually attested, but the conjugation is not in doubt. In the 1. and 2. plural (and of course in the post-syncopic dual) it is

sg.	1.	*ádhām*	< **e-dheH-m*	*ákaram*	< **e-kʷor-m*	*ávidam*	< **e-wid-o-m*
	2.	*ádhāḥ*	< **e-dheH-s*	*ákar*	< **e-kʷor-s*	*ávidaḥ*	< **e-wid-e-s*
	3.	*ádhāt*	< **e-dheH-t*	*ákar*	< **e-kʷor-t*	*ávidat*	< **e-wid-e-t*
pl.	1.	*ádhāma*	< **e-dheH-me*	*ákarma*	< **e-kʷor-me*	*ávidāma*	< **e-wid-o-me*
	2.	*ádhāta*	< **e-dheH-te*	*ákarta*	< **e-kʷor-te*	*ávidata*	< **e-wid-e-te*
	3.	*ádhan*	< **e-dhH-o-nt*	*ákran*	< **e-kʷr-o-nt*	*ávidan*	< **e-wid-o-nt*

Table 4.2.1c. Aorist pararadigms of Vedic *dhā* 'place' and *kṛ* 'make' (root-aorists), and *vid* 'find' (thematic), with Proto-Indo-European reconstructions.

necessary to assume analogical extension of the stem of the singular; but this is not an unlikely assumption, since some analogical disturbance must be assumed, anyway, as long as it is supposed that any original form will contain just one full-grade vowel (disregarding the augment). It is in fact the standard view that precisely this analogical extension has taken place (see, e.g., Schwyzer 1939–50:1.741; and Szemerényi 1980:261; it is also the conclusion of Bammesberger 1982:49–50 that the root-aorist originally showed the same quantitative ablaut alternations as the athematic present), since three Greek verbs seem not to have suffered the change: τίθημι 'place' ἵημι 'send', and δίδωμι 'give' show full-grade forms in the singular (e.g. ἔ-θη-κ-α, -κ-ας, -κ-ε), but weak-grade forms in the dual and plural (ἔ-θε-μεν, -τε, etc.). Additional evidence is provided by relic forms like Hom. 3. du. aor. βάτην (to βαίνω 'go'), and by forms like Hom. ἔκταμεν, ὄρμενος, Κλύμενος, etc., discussed above. In the Vedic paradigms, once again, the 3. plural forms fail to undergo regularization with the rest of the plural, no doubt because of the recognition of the regular identity of 3. plural and participial stems. (Cf. how in Greek when innovative perfects middle to consonant-stems were formed, it was the participial ending -μενοι plus 'be' that was adopted, e.g. πεπλεγμένοι εἰσί : 1. sg. πέπλεγμαι, to πλέκω 'weave'.) Note how in root-aorist 1. sg. forms like Vedic *ákaram* the ending is *-am* rather than *-a*, reflecting nonsyllabic **-m* later vocalized, just as with the accusative singular in athematic declension (§2.2).

4.2.2. *Aorist stems and present stems.* A feature of Kerns and Schwartz' account of the rise of the aorist system, as summarized above (§4.2), is that aorists were created as preterite formations to uncharacterized stems, and thus originally existed beside normal uncharacterized present stems. The primary difficulty with this analysis is that it must then be assumed that eventually these uncharacterized present stems simply fell out of use, yielding to the more 'colorful' characterized stems that arose beside them. This loss seems odd and somewhat coincidental, and a structuralist's intuition would be that a more direct causal relationship could be discovered between the formation of aorist stems and the rise of characterized presents, without the intervention of these coincidentally-lost uncharacterized presents. In that event the most likely causal relationship is a push-chain phenomenon: the forms that the uncharacterized aorists reflect originally served both present and aorist functions; and characterized stems, when they arose, assumed specifically presential function, thus permitting the uncharacterized stems to assume specifically aorist function. This account is not actually so very different from consensus opinion about the rise of uncharacterized aorists, since it is an established point of agreement that 'ein Bildungsunterschied zwischen den Formen des Präsensstamms und den Formen des Aorists ursprünglich nicht vorhanden war' (Brugmann 1897–1916: 2.3.44). (An indirect relic of this stage at which present and aorist stems were not formally distinguished is perhaps reflected in the Vedic injunctive—see §4.5.) The effect of this analysis then is merely to rearrange the chronology of events: aorists and presents did not come to be distinguished at the level of inflectional morphology (i.e. as resolved forms) before the rise of characterized presents. This is not to say that there was no distinction at all between present and aorist constructions at this early stage of the parent language: after all, it is entirely possible that the two were distinguished syntactically—perhaps, for instance, by the obligatory use of the augment, still a separate word, when the common verb form was employed in an aorist construction. This would in fact explain why the use of the augment in Greek and Sanskrit is facultative: though originally syntactically obligatory in the protolanguage, it came to be optional because the present eventually developed primary inflections, thus rendering the augment redundant as a tense marker.

There are two kinds of evidence for the claim that characterized stems in presential function arose at the same time that certain uncharacterized stems became limited to aorist function:

1) In Sanskrit there is a remarkable peculiarity of reduplicated presents that they usually correspond to root-aorists, and almost never to thematic aorists. This pattern is surprising, inasmuch as the present and aorist systems are generally assumed to be completely autonomous. The evidence is collected in Table 4.2.2, where all the Sanskrit roots that form reduplicated presents are listed (information based on Whitney 1885:212–3 et passim). The numbers after each root indicate what kinds of aorists are formed from the root: 1 = root-aorist, 2 = thematic aorist, 3 = reduplicated aorist, and 4 = sigmatic aorist. A question mark reflects Whitney's own reservation; parentheses enclosing a number indicate that such aorists are attested only in post-Vedic texts; and square brackets indicate aorists not attested in use, but prescribed by the ancient grammarians (not to be regarded as reliable, though in fact such prescriptions almost invariably confirm the pattern). The reduplicating class of presents was not a productive one in Sanskrit, and so all but two of these roots

ṛ 'go' 1, 2 [4]
kṛ 'commemorate' 4
gā 'go' 1 (3) 4
ghṛ 'drip' —
ghrā 'smell' (1) [4]
ci 'note' 1 (4)
tṛ 'cross' 1, 3, 4
dā 'give' 1, 2 [3] 4
diś 'point' [3] 4
dī 'shine' —
dhā 'put' 1, 2, 4
dhī 'think' —
nij 'wash' 2 [3] 4
nī 'lead' [1, 3] 4
pā 'drink' 1 [3] 4
pī 'swell' —
pṛ 'pass' 3, 4
pṛ 'fill' 1, 3 (4)
pṛc 'mix' 1, 4
bhas 'devour' —
bhī 'fear' 1, 3, 4
bhṛ 'bear' 1 (3) 4
mad 'exhilarate' 1, 3, 4
man 'think' 1 [3] 4
mā 'measure' 1, 4
mā 'bellow' 3?
mikṣ 'mix' —
mī 'damage' (1) 4
yas 'be heated' (2) [3, 4]
yu 'separate' 1, 3, 4
rā 'give' 4
vac 'speak' 1, 2 [3]
vaś 'desire' [1, 3] (4)
vic 'sift' [3, 4]
viṣ 'be active' 1? [2] 4
vṛt 'turn' 1, 2, 3 (4)
vyac 'extend' [1, 3, 4]
śā 'sharpen' 1? (1) [4]
sac 'accompany' 1, 4
sas 'sleep' —
su 'press out' 1 (3) [4]
sṛ 'flow' (1) 2, 4
hā 'leave' 1 (3) 4
hā 'go forth' 4
hu 'sacrifice' 1 [3] (4)
hur 'be crooked' [1] 3 (4)
hū 'call' 1, 2 [3] 4
hṛ 'take' (1) [3] 4
hri 'be ashamed' 1? [1, 4]

Table 4.2.2. Roots that form reduplicated presents in Sanskrit, along with the classes of aorists formed to these roots.

(*sas* and *hrī*) are attested in the present in the Vedas themselves. Ignoring the aorists not attested in the Vedas, the figures are these: Of the 49 roots, 38 have attested aorists, and of those 38, 25 form root-aorists (32 if the post-Vedic and grammarians' forms are included).[7] On the other hand, of those 38, just seven form thematic aorists (or 9 if the post-Vedic and grammarians' forms are included); but of those seven, three (to *dā*, *dhā*, and *hū*) must be disregarded as transfer stems (so designated by MacDonell 1910:371), being quite rare beside the corresponding common root-aorist forms; and perhaps another, *vṛt*, ought to be added to those three, since it is attested only as a root-aorist in the Rigveda (thrice), with thematic forms first appearing in the

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[7] MacDonell (1910:374–7; cf. Whitney 1885:151) is doubtless right to classify *ávocat* and similar forms of the root *vac* 'speak' as reduplicated rather than thematic aorists.

Atharvaveda. Thematic aorist forms to *r̥* (<**Hr̥*) are likely also to be transfers, given the point established above (§4.2.1) that thematic aorists are not generally formed from biconsonantal roots; and, in fact, a root-aorist to *r̥* is well attested in the Rigveda. This leaves just two roots with unexplained thematic aorists: *nij* (Atharvaveda only) and *sr̥*, the latter of which, it was noted above, is peculiar inasmuch as it is one of the few biconsonantal roots that do form a thematic aorist.

And so perhaps two, at most three roots that forms reduplicated presents normally also form thematic aorists, while 25 form root-aorists. This ratio is far out of proportion to the ratio of all roots that form thematic aorists to those that form root-aorists in the Vedas, which is 67:107 (86:140 when the post-Vedic forms are included). Perhaps more striking than the figures themselves is an examination of the table, where the numbers form a continually reiterated pattern: these roots usually form root-aorists, beside which reduplicated and/or sigmatic aorists may be found, but only rarely thematic aorists; and almost never is there a thematic aorist unless an athematic one is found beside it. The exceptions are so few, and generally so transparent, that it seems more than likely that originally thematic aorists were not formed to these roots. This regularity then provides a clue to the origin of these root-aorists, as well as of the reduplicated presents. Such a restriction on the type of aorist that may correspond to reduplicated presents is difficult to understand unless the historical processes that dictate that these particular roots should form reduplicated presents are somehow related to those that dictate that these aorists should be limited to the athematic type. That exact relationship will be explored in more detail below (§4.4), but for now it will suffice to suggest once again that the root-aorists were themselves at one time athematic forms functioning as both presents and aorists. Their function became specialized at the same time that reduplicated forms arose to assume the presential function. That these reduplicated stems are not in fact original to the present system is demonstrated by their anomalous accent. The normal Vedic accent in the indicative active singular of all athematic present classes, and even some thematic, falls on a full-grade vowel that apparently bore the accent at the time of syncope—except for the reduplicating class, which accents the reduplicative syllable in the singular. There is no apparent reason for the accent to have shifted in a form like *jígati* 'goes', and so perhaps the best explanation is that the reduplicating class of presents is a late formation, created after the morphologization of quantitative ablaut. The assertion that reduplicated presents arose and took the place of certain root-aorists that originally also served as present-tense forms then conforms to this evidence for the late and analogical creation of the reduplicating present class.

2) The second sort of evidence for the origin of the root-aorist in a common present-aorist category comes from a small group of very common verbs of the root-class that fail to form normal aorists in Vedic and Greek. The commonest is **es-mi* 'be' (Gk. εἰμί, Vedic *ásmi*). In this instance the failure to form an aorist has a transparent semasiological explanation, since there is no context which in all strict logic could require the expression of aorist aspect in regard to 'being' plain and simple. In other verbs of this type the reason for the failure to form an aorist is not as clear, but the failure is nonetheless remarkable in such common verbs: the best examples are **ey-mi* 'go' (Gk. εἶμι, Vedic *émi*, to which a root-aorist (*īyāt*) first appears in the language of the epics), **ed-mi* 'eat' (Hom. ἔδω and Attic ἐσθίω, the latter based on the imperative of the original athematic paradigm, both verbs using the suppletive aorist ἔφαγον; and *admi* has no aorist in the Vedas, a sigmatic aorist first appearing in one of the Upaniṣads), and **HwéH-mi* 'blow.' (Hom. ἄημι [3. sg. ἄησι], Vedic *vāmi*). Moreover, the very common root *han* 'strike' has no aorist in the Vedas (a sigmatic aorist is found in one of the Brahmaṇas, and a reduplicated aorist starts to appear in the epics), and while there is a thematized root-aorist to the Greek cognate, the present is not a thematized root-present like ἔδω, but is a characterized form (θείνω < *θενι̯ω). Likewise the Vedic root *bhā* 'shine' builds a root-class present, but no aorist, while the cognate Greek present is doubly characterized (φαίνω 'show' < **bhl̥H-n-y-*), and the aorist is based on it (ἔφηνα). What is remarkable about these roots is that they all form presents according to the root-class, and that is understandable if root-aorists were in fact originally undifferentiated from presents of the root-class. These then are simply verbs that never assumed exclusively

aorist function, but continued to serve as present-tense forms. These roots on the whole do not, as a matter of fact, form characterized stems in Indic, disregarding later pure thematizations, while most very common verbs of other classes will correspond to a variety of characterized stems. This pattern is understandable if the rise of characterized stems is directly related to the relegation of uncharacterized stems to aorist function. The process is explained in more detail below (§4.4).

Establishing the ablaut pattern of root-class presents demands a discussion of the verb *_es-mi_ 'be'. The Vedic forms of the present are generally believed to reflect accurately the PIE paradigm. So, for instance, Szemerényi (1980:288) reconstructs 1. sg. *_ésmi_, 2. *_és(s)i_, 3. *_ésti_, 1. pl. *_smés(i)/smós(i)_, 2. _sté(s)_, 3. *_sénti_. But in fact, although *_senti_ is undoubtedly correct in the 3. plural, these reconstructions of the 1. and 2. plural forms do not account for anything outside of Indo-Iranian—not even for Latin 1. pl. _sumus_ (cf. 2. pl. _estis_—for an explanation of the difficulties pertaining to _sumus_ see Szemerényi 1964:190–5). Rather, the evidence of several discrete IE branches points to 1. pl. *_esmés(i)/esmós(i)_, 2. *_esté(s)_, 3. *_sénti/sónti_. This, for instance, is what Greek requires: Hom. 1. pl. εἱμέν (Dor. ἡμές), 2. ἐστέ, 3. εἰσί (=Dor. ἐντί; the spiritus lenis is no doubt analogical to the rest of the paradigm; certainly, at any rate, the stem in the Doric 3. plural is not *_es-_, while it is in the other plural forms). Old Church Slavonic shows the same pattern, 1. pl. _jesmъ_, 2. _jeste_, 3. _sǫtъ_ (<*_sonti_); and the Celtic evidence also indicates *_es-_ in the first person and *_s-_ in the third: OIr. 1. pl. _ammi_ (<*_esmesi_; 2. _adib_ is etymologically obscure), 3. _it_ (=OW _hint_ < *_senti_). Even in Indo-Iranian itself the pattern is to be found in Old Persian: 1. pl. _amahy_ (<*_esmesi_; 2. pl. unattested), 3. _hantiy_ (<*_senti_). The pattern 1. *_es-_, 2. *_es-_, 3. *_s-_ is sufficiently irregular that it is inconceivable that it could have arisen independently in at least four separate IE branches. Moreover, given the proposition that the plural paradigm was irregular, it is readily understandable that Indic and Avestan should have regularized the paradigm, so that it shows an ablaut alternation similar to that of other athematic present classes: strong stem in the singular, weak stem in the dual and plural. Analogical regularizations have affected the paradigm of **esmi* in other languages, as well, and the very pattern of analogical replacement points to the original irregularity posited here. For instance, Gothic 3. pl. *sind* accurately reflects **senti*, while 1. pl. *sijum*, 2. *sijiþ*, and 1. dual *siju* are clearly analogical, no matter what one's assumptions about the original paradigm. That precisely these forms should have been replaced is readily understandable if the root in these forms was originally different from the root in the 3. plural. Similarly in Baltic the paradigm reflects **es-* throughout, except that the 3. plural form alone (aside from the dual category) has been eliminated altogether from present-tense conjugation. Perhaps the best imaginable motivation for the loss of the 3. plural form is the very irregularity demonstrated by this verb and others like it, due to the participial origin of the 3. plural form (but cf. Endzelīns 1971:204).

Finally, most have favored the reconstruction **smés(i)*, etc., in part because it conforms to common assumptions about ablaut, assumptions I share: an archaic form ought to have one full-grade vowel, and that vowel should be accented. But in fact the pattern set by Vedic *smási*, etc., is idiosyncratic, since, where it is possible, other athematic verbs of the root-class show reduced grade rather than zero grade in the root of the 1. and 2. plural. Examples are 2. pl. *hathá* 'strike' (<**g*^{w}*hn̥thé*; cf. 1. pl. *hanmási* < **g*^{w}*hn̥mési)* : 3. *ghnánti*; and 1. pl. *imási* 'go', 2. *itha* : 3. *yánti*. The reason for the reduced grade/null grade discrepancy is etymological, and results from syncope: the 1. and 2. plural forms were created normally from non-apocopated stems (e.g. **g*^{w}*hàna-más* > **g*^{w}*h*$_{e}$*nmés[i])*, while the 3. plural is of participial origin, with a different accentual pattern (**g*^{w}*hanánat-* > **g*^{w}*hnént[i])*. So likewise for the verb 'be' there should be 1. pl. **(H)*$_{e}$*smés(i)* > **(H)esmés(i)*, with restoration of ***$_{e}$ to full grade where it could not form a syllabic consonant; but 3. pl. **(H)sént(i)*. Stem regularization has affected one other root-class present, for predictable reasons: Vedic *ad* 'eat' has 1. pl. *admasi*, but 3. *adanti* for expected **dánti*. The initial vowel is paralleled in the present participle *adánt-*, where it most likely serves the purpose of distinguishing this form from the original participle, which had come to be used as a regular root-noun *dant-* 'tooth'.[8] Considering the close correspondence of vocalism between the 3. plural and the present participle in general in Sanskrit (see the last two paragraphs in §4.1), it is not surprising that the initial vowel should have been extended from the participle to the finite form.

The distinction between reduced grade in the 1. and 2. plural and zero grade in the 3. plural perhaps makes it easier to understand how root-aorists came to restore full-grade vocalism of the root in the 1. and 2. plural but not the 3. plural, given the assertion that such root-aorists were originally identical in conjugation to forms reflected as athematic presents. In that event there was consistently an ablaut difference between the 3. plural and the rest of the plural and dual forms, while the latter in some verbs had developed, on a regular phonological basis, stems identical to the singular, just as with the verb 'be'—e.g. aorists to *pad* 'go', *tap* 'heat', *sad* 'sit', etc., in all of which the root vowel *$_e$ in the plural would have been restored to full grade automatically. Therefore the pattern of strong root vocalism in all forms except the 3. plural already existed in some root-aorists, and the analogical change in the others may be attributed to a combination of regularizing tendencies: regularization of stem-formation within a morphological class, and reduction of paradigm allomorphy.

4.2.3. *The sigmatic aorist.* The origin of the *-s-* element in the sigmatic aorist is disputed. Sturtevant and Hahn (1951:1.143) suggest that it is identical to the ending *-š* attached to 2. and 3. singular preterites of the Hittite *ḫi*-conjugation. Brugmann (1897–1916:2.3.390–2) argues that the *s*-aorist began as a preterital form of presents with a *s*-suffix, e.g. Gk. ἀέξω and OIcel. *vaxa* 'increase' beside Lat. *augeō*. For references to literature on these and other views see Szemerényi (1980:265 nn. 17–21). It is not possible to determine whether the sigmatic aorist springs from so limited a source as, for instance, *s*-presents, since this type of aorist formation was highly productive in Proto-Indo-European. Nor is it possible to say for certain whether the progenitors of this formation predate syncope, yet there are a few signs that they do. Sigmatic aorists are athematic, in most cases a good sign of a pre-syncopic formation. And although these stems do not show quantitative ablaut alternations between singular and plural, there is a regular ablaut difference between the active and middle stems in Vedic. It is possible, then, that these stems have undergone the same sort of regularization as athematic and thematic aorist stems. The indicative active apparently had lengthened grade in Proto-Indo-European (Greek has innovated, adopting the normal full-grade present stem: see Schwyzer 1939–50:1.751–2), but this probably replaces simple full grade. The lengthening may have begun in forms like 2. sg. **eghes-s-s* > Vedic *aghās*, perhaps also **ebher-s-t* > **ebher-r-t* > *abhār*, etc.

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[8] The same need for differentiation will account for the unexpected *o*-quality of the prothetic vowel in Gk. ὀδόντ- 'tooth' : Hom. part. ἔδοντ-.

In the sigmatic aorist the *-s-* is attached directly to the last consonant of the stem, and the endings are attached directly to the *-s-*, without the theme vowel. If the progenitors of this class do predate syncope, perhaps it is best to reconstruct a *s*-morpheme (whatever its origin) attached to the root after apocope. This would explain why sigmatic aorists use the 3. pl. ind. act. ending *-ur* in Indic rather than the *-an(t)* of the other aorist classes: the 3. pl. ind. active is based on the participle, and of course *-s-* is a specifically aorist-forming element, and so is not found in these participles that could originally serve either present or aorist function. Thus a different ending was required, and so the ending that is also found in the Indic perfect was adopted. This ending also spread from the sigmatic aorists to the root-aorists, where it appears already in the Vedas side by side with etymological *-an*. That the root-aorist forms in *-ur* are younger than those in *-an* should be evident from the complete absence of a full-grade vowel in unaugmented forms in *-ur*, e.g. *dúr* (root *dā* 'give'), *dabhúr* (*dambh-* 'harm'), etc. In the 3. pl. *s*-aorist, on the other hand, the root is in full grade, later lengthened, and so this form could predate syncope.

4.2.4. *The reduplicated aorist.* Doubtless there were some reduplicated aorists in Proto-Indo-European, since they are found in both Indic and Greek, and the identity of Gk. εἶπε and Vedic *ávocat* 'said' is striking (see above, §2.1). Yet the category must have been small, since very few such aorists are found in either language, and many of the Indic forms are patently late and analogical—e.g., there is a close semantic connection between causatives and reduplicated aorists in Indic, and some aorist forms even contain the inorganic *-p-* that appears in some causative stems, e.g. 3. sg. aor. *átiṣṭhipat* corresponds to causative *sthā-paya-* 'cause to stand'. These causatives of course are late formations, and probably reduplication has been used, in forming their aorists, in order to distinguish aorists from imperfects. Not all Vedic reduplicated aorists are based on such causatives, but the adoption of reduplicated stems to form aorists in Proto-Indo-European itself very likely had a similar motivation—the need to create new aorist stems after the rise of characterized presents.

4.3. THE PRESENT SYSTEM. It was asserted above (§4.1) that apocopated stems were not used in the asigmatic aorist system, while some presents are based on apocopated stems—e.g. Skt. *dvéṣṭi* < **dawáyas-t*. That apocope should have affected present stems but not the stems of thematic and root-aorists implies that the aorist stems are older. It seems at first peculiar that stems of the aorist, surely a marked category with respect to the present, should apparently have arisen before the present stems; but that peculiarity is explained by the evidence that these aorists *were* originally presents, or rather were forms that served both present and aorist functions. Prior to sorting out the precise relationships between the stem types of the present and aorist systems, it will be useful to examine in more detail the distribution of apocopated and non-apocopated stems in the present system.

4.3.1. *Nasal presents and the origin of the differentiation of athematic present types.* Since the reduplicated and root-stem presents have already been discussed, it remains only to speak of the nasal presents to complete this survey of athematic types. The prevailing view is that the IE *n*-infix, though now apparently meaningless (except as a present-tense marker) was originally a meaning-bearing affix, identical to the morpheme *-nen-* or *-nin-* infixed in five Hittite verbs to form causatives. The *n*-infix is then to be regarded as having originally been a suffix, to which a further suffix was later attached. So for instance Skt. 3. sg. mid. *riñkte* (root *ric* 'leave') represents an old PIE weak-grade root **li-* (cf. Gk. λείπω, λιμπάνω 'leave') to which **-n-* was attached; and then the extension **-kʷ-* could later be attached to both the stem **li-n-* and the full-grade stem **ley-* without the nasal infix. This, for instance, is the view of Brugmann (1897–1916: 2.3.274), Hirt (1921–37:4.204), and Kuiper (1937 passim; and for a survey of earlier views, see pp. 1–34). Yet there is no IE root **li-* attested beside **likʷ-*, and the same absence of the unextended form can be remarked for all but a very few stems with nasal infixes—cf. Warren Cowgill's remark that 'many Indo-European roots contain three or more consonants (**k̂lew-* "hear" happens to be one) and cannot be analyzed into a consonant core plus suffix (with perhaps also an enlargement or two) without attenuating to almost nothing the semantic content of the resulting two-consonant roots, not to mention the a-priori unlikeliness of a language whose root morphemes all follow exactly the same pattern' (1963:251). This analysis of *-n-* as suffixal at any rate puts the creation of nasal present stems at an extraordinarily early date, since a considerable amount of time must be allowed for the loss of most of the biconsonantal roots corresponding to the stems with nasal infix. Equally improbable is the suggestion, mentioned and rejected by Kronasser (1966:433 n. 1), that the *-n-* represents a suffix that has undergone metathesis with the final consonant of the verb root.

The distribution of ablaut types among root-stem and nasal presents reveals that *-n-* was originally not a morpheme at all, but has a straightforward phonological explanation, being a response to phonological difficulties raised by syncope. The ablaut type of nasal presents is disputed. Given the alternation of 3. sg. **yunégti* (>Skt. *yunákti* 'joins') with 1. pl. **yungmé(s)* (>Skt. *yuñjmáḥ*), perhaps the majority of Indo-Europeanists analyze the root as **yug-*, and the infix as **-ne-* alternating with **-n-*. This for instance is the view of Brugmann (1897–1916:2.3.274), Meillet (1937:215), Cowgill (1963:252), and Kuryłowicz (1964:106). The alternative view is that it is the root rather than the infix that shows the ablaut—i.e. **yu-n-eg-ti* and **yu-n-g-me(s)*. This is the view of Hirt (1900:138), Kuiper (1937 passim), Benveniste (1935:159–60), and all proponents of the latter's theory of the PIE root, including Lehmann (1952:17), Puhvel (1960:14–15, with references, et passim), and Watkins (1969:24 et passim). It should be pointed out in favor of the latter interpretation that if the former were correct, nasal presents would be the only athematic present stems showing no paradigmatic ablaut alternation in the root: if the infix is simply **-n-*, not **-ne-*, then nasal presents show precisely the ablaut alternations expected of athematic presents. Moreover, Strunk (1967:28–9) points out that if the infix is *-n-* rather than *-ne-*, then there is a direct correspondence between the ablaut grade of nasal presents and root-aorists formed to the same roots—e.g., Skt. pres. *śr̥ṇóti* corresponds to aorist *áśrot*, both having full grade, while the present imperative *śr̥ṇu(d)hí* corresponds to the aor. imper. *śrudhí*, both with weak grade.

The typology of PIE conjugation then favors the interpretation that the infix is simply *-n-* throughout, and if that is true, then the root structure of nasal presents, disregarding the infix, is without exception *((C)C)CeC-* (mainly *CReC-*, but also *CCReC-*, *CR̥CeC-*, etc.). By contrast, it does not seem to have been pointed out, the root structure of root-class presents is in nearly perfect complementary distribution to that of the nasal presents. There are 58 root-class presents attested with full-grade roots in the Vedas.[9] These are listed in Table 4.3.1, in full- or lengthened-grade form. Of the 58 stems, 19 (type I) have the structure *(C)CeCC-*, 36 (type II) have *CeC-*, and just three (type III) have *CCeC-*. It is apparent that biconsonantal roots and roots with precisely two consonants after the full-grade vowel form root-class presents, while triconsonantal roots with a single consonant after

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[9] I.e., there are 58 Vedic roots to root-class presents attested in the present indicative and injunctive active (information based on MacDonell 1910:336–8). Since the question is whether the full-grade form of the root is *(C)CeC-* or *CeCC-*, reduced-grade forms are valueless, and so attestations outside the present indicative and injunctive active must be disregarded. The overall number of roots attested as root-class presents in the Vedas, including those attested only in weak grade, is 108 (see Whitney 1885:211–2). The table excludes one form MacDonell classifies as a root-stem present, 2. sg. *nakṣi* (*naś* 'attain'): both Grassmann (1964: 719) and Whitney (1885:89) regard this as an aorist.

Type I (19)

amī 'injure'	*dar* (*drā*) 'pierce'	*bravī* 'say'	*ved* 'know'
cakṣ 'see'	*deh* 'smear'	*mārj* 'wipe'	*ved* 'find'
chand 'seem, please'	*doh* 'milk, derive'	*yodh* 'fight'	*śvasi* 'blow'
joṣ 'enjoy'	*dveṣ* 'hate'	*reḍh* (*rih*) 'lick'	*ho* (*hū*) 'call'
tavī 'be strong'	*ne* (*nī*) 'lead'	*rod* 'weep'	

Type II (36)

ad 'eat'	*dan* ? 'straighten'	*bhā* 'shine'	*vaś* 'desire'
as 'be'	*dā* 'share'	*mā* 'measure'	*vah* 'carry'
e 'go'	*dā̆s* 'worship'	*yaj* 'sacrifice'	*vā* 'blow'
kar 'make'	*dhak* (*dah*) 'burn'	*yam* 'reach'	*śā̆s* 'cut'
kṣ(n)o 'whet'	*par* 'pass'	*yo* 'join'	*sah* 'prevail'
ghas 'eat'	*pā* 'drink'	*yā* 'go'	*sto* 'praise'
ce 'note'	*pā* 'protect'	*rad* 'dig'	*han* 'strike'
je 'conquer'	*bhaj* 'divide'	*rā* 'give'	*har* 'take'
tak 'rush'	*bhar* 'bear'	*rāj* 'rule'	*ho* 'sacrifice'

Type III (3)

kṣe 'dwell, possess'	*prā* 'fill'	*śro* 'hear'

Table 4.3.1. Roots forming root-class presents in the Vedas (full-grade forms only).

the vowel form nasal presents. Moreover, the counterevidence of at least two of the three forms of type III is probably false: *śróṣi*, the only evidence for a root-stem present to the root *śro*, is a hapax legomenon in the Rigveda, standing against more than 150 Rigvedic attestations of the present stem *śr̥ṇó-/śr̥ṇu-*, a stem with *n*-infix such as should be expected from a root with this structure. Likewise *prā́si* and *prāsi* are both hapax legomena in the Rigveda, as against 30 Rigvedic attestations of the expected nasal present stem *pr̥ṇá-/pr̥ṇi-*, in addition to more than 25 thematized forms of the same. These forms *śróṣi* and *prā́si* are most likely originally foreign to the present system, being members of a small group of almost exclusively Rigvedic 2. sg. forms with imperative value, many with no related root-stem forms, and whose 'formal character is somewhat disputed' (Whitney 1889:237; see also MacDonell 1910:336 n. 13 for references; and Grassmann [1964:886, 1428], who classifies these as aorist subjunctives). This leaves just *kṣe* in type III, and though it is well attested, its etymology is dubitable: Pokorny (1959:1.626) reconstructs **k̂þei-*, on which see further below (§5.1).

And so there is among the Vedic root-stem presents at most one reliable exception to the regular distribution of root types between this class and the nasal presents: biconsonantal roots and thème I triconsonantal roots form root-class presents, while thème II triconsonantal roots form nasal presents. Even if nasal presents are regarded as reduced-grade roots with ablauting infixes, there remains a peculiar distribution that must be explained, since thème II roots do not form root-class presents—in fact, it would have to be assumed, thème II roots do not form athematic present stems at all. Such a restriction has no apparent explanation, and so to account for what happened to the thème II presents it is better to assume that they are reflected as nasal presents, and the infix therefore is **-n-*, not **-ne-*.

What this complementary distribution of root types implies is that purely phonological matters must somehow be tied up with the origin of the nasal infix, since it coöccurs, and not optionally, with a specific phonological structure within a morphological category. This is not the way an infix or suffix should be expected to behave if it were originally a morpheme unto itself. That it should have been a morpheme would be believable if it could be shown that the presence of the infix *conditioned* the complementary distribution of root types. But such a morpheme cannot condition the *nonoccurrence* of thème II roots in the root-class of presents: one cannot assume that thème II presents do not occur among the root-presents simply because this morpheme *-n-* happened to become attached to all of them. That amounts to distributing the morpheme on a purely phonological basis, which of course natural languages do not do. Rather, one would have to posit a different and unrelated conditioning factor to account for the absence of thème II types from the root-class presents, resulting in an extraordinary distributional coincidence. This line of reasoning is needlessly complex. It is simpler to suppose the _n_-infix was not originally a morpheme, but was phonologically conditioned; and the theory of syncope provides a straightforward explanation. The nasal presents reflect tri- and polyconsonantal roots which, after apocope, accented the last vowel in the root. In many instances syncope would have produced difficult consonant clusters at the beginning of the word, e.g. _*tanák-t_ > _**tnékt(i)_; _*yawág-t_ > _**ywékt(i)_; _*rawádh-t_ > _**rwéddh(i)_, etc. Such forms might be pronounceable after vocalic finals in external sandhi, but only with difficulty under other conditions, and consequently, vocalic value was necessary for the antevocalic resonants. However, at this time in the development of the protolanguage, shortly after syncope, antevocalic resonants were still not permissible: antevocalic _*-_$_e$_y-_, _*-_$_e$_r-_, etc., arose only through analogical processes, and regularly reverted to _*-ey-_, _*-er-_, etc. (§1.9). And so a nasal consonant was inserted after the resonant in order to render vocalic pronunciation possible: _*y(u)wékti_ became _*yu-n-ékti_, and _*t(_$_e$_)nékti_ became _*tn̥-n-ékti_, giving Skt. _yunákti_ and _tanákti_, respectively. That the syllabicity before the nasal is of post-syncopic origin is in fact suggested by a form like Gk. πίτνημι (<_*p_$_e$_tneH-_), discussed above (§1.9, with n. 11 to Chap. 1): if _*p_$_e$_t-_ had arisen by means of the same vowel reduction associated with syncope itself, one would expect *$_e$ to have been restored to full grade. Rather, *$_e$ here is epenthetic and post-syncopic. As with some other effects of sandhi with an originally purely phonological motivation, like the final _-i_ of some primary endings (§4.1), the _n_-infix later came to assume a morphological function, distinguishing these stems as presents—a critically important function at the time, for reasons offered below (§4.4). And so _n_ was infixed in some stems where there was no phonological motivation. Kuryłowicz (1964:106) recognized some time ago that _n_-infixation might be related causally to the structure of thème II roots, and so this analysis is not entirely unanticipated.

Given that nasal presents consistently reflect thème II roots, it is not possible to say for certain whether any or all of these suffered apocope before acquiring inflections. On the other hand, a striking proportion of these roots, in thème I form, serve to create root-aorists corresponding to these nasal presents, and these certainly were formed after apocope, e.g. Vedic sj. *párcaḥ* (*pr̥ṇákti* 'mixes') and *chedma* (*chinátti* 'cuts off'). In fact, of the 29 roots attested as forming seventh-class nasal presents (the nasal type least affected by analogical disturbances), eighteen have attested aorist forms, and all but four of those eighteen form thème I root-aorists. Such forms contradict the general pattern established above, relying on the Greek evidence (§4.2.1), that biconsonantal roots and thème II triconsonantal roots form PIE root-aorists, while thème I triconsonantal roots form PIE thematic aorists. In the present instance there is evidence from both Greek and Latin that root-aorists corresponding to nasal presents are an Indo-Iranian innovation. The number of attested asigmatic aorists in Greek corresponding to these nasal presents is small, but the attested forms consistently show weak stems, e.g. ἔπτισα to πτίσσω 'grind (grain)' (cf. Vedic *pináṣti* 'crushes'), pass. ἐζύγην to ζεύγνῡμι 'yoke' (Vedic *yunákti*, pass. root-aorist *áyoji* beside Skt. thematic aor. *ayujat*), and ἔλιπον to λείπω, λιμπάνω 'leave' (Vedic *riṇákti*, pass. root-aorist *areci* beside Skt. them. aor. *aricat*). Latin likewise has the 'perfects' *scidī* to *scindō* 'cut' (cf. Vedic *chinátti* 'cuts off', root-aorist *chedma*) and *fidī* to *findō* 'split' (Vedic *bhinátti* 'splits', root-aorist *ábhedam* beside them. aor. *bhideyam*). As these last examples demonstrate, the Sanskrit thème I aorists are frequently attested beside other aorist types, which may be considered older—cf. also Hom. redupl. aor. inf. πεφιδέσθαι to φείδομαι 'spare'. If thème I root-aorists really are an Indo-Iranian innovation, a likely model for the full-grade stem is the passive aorist (illustrated in the examples above), which must stand etymologically outside the aorist system altogether, since it is invariably athematic and strong-stemmed, regardless of whether the corresponding active stem is thematic or athematic (see note 5 to this chapter). Just as thème I root-aorists appear to be an Indo-Iranian innovation, so do these passive aorists.

In sum, then, it appears that the oldest stems formed from these roots that serve to create nasal presents might well be thematic aorists like Skt. *aricat* and Gk. ἔλιπον, and in that event perhaps the etyma of nasal presents, with different accent, were formed to replace those aorists in the present system. Thus it would be necessary either to derive, for instance, Skt. 1. pl. *yuñjmáḥ* from Pre-IE **yawàgmá* < **yawág* + *má* and assume that by the time of apocope the law of homorotony no longer applied as it had; or to assume that the nasal element in the plural is analogical to the singular.

The causative-forming function of Hitt. *-nen-* must now be regarded as an Anatolian innovation (but cf. Kuryłowicz 1964:106), and its acquisition of this meaning must be dated to a time when the other Hittite causative-forming suffix, *-nu-*, had not yet been abstracted from stems in *-u-* with nasal infix—a development that dates to Proto-Anatolian, since *-nu-* has the same function in Luwian and Hieroglyphic (Friedrich 1960–67:1.190). It is, after all, unlikely that *-nen-* and *-nu-* independently acquired the same meaning. As for the form of the suffix *-nen-*, Kerns and Schwartz (1972:30) are likely to be right that a form like *ḫarnenkmi* 'destroy' represents a conflation of strong **ḫarnek-* with weak **ḫarnk-*; for another view see Sturtevant and Hahn (1951:1.127).

4.3.2. *The thematic presents.* The origin of the theme vowel has occasioned much debate, and it is not even settled for certain whether the vowel is actually a suffix. Yet while differing widely in respect to details, nearly all explanations rely on the assumption that all verbs originally showed the accent and ablaut alternations encountered in the athematic type, and the thematic type therefore has suffered analogical leveling of one kind or another. For instance, Kuryłowicz (1956:72) argues that the theme vowel originated in the aorist, and spread from there to the present, while Kerns and Schwartz (1972:2–3) propose that it originated in the 3. plural and spread thence throughout the paradigm. In both instances it is assumed that thematic stems with weak-grade roots and accented theme vowel (Brugmann's type B [1897–1916: 2.3.114], e.g. Skt. *tudáti* 'pushes, thrusts') are the older type, and the theme vowel was later added to stems in full grade with accented root (Brugmann's type A, e.g. Skt. *bhávati* 'is'). Stems with accented root in weak grade are even further removed from the time when quantitative ablaut was phonologically conditioned. Since Vedic Sanskrit best preserves the place of the PIE accent, its evidence is the most valuable.

The sixth present class of Sanskrit verbs (Brugmann's type B) consists almost solely of triconsonantal roots. There are a few apparent exceptions attributable to initial laryngeals, e.g. all the roots beginning with vowels, such as *r̥dá-* 'stir, dissolve' (cf. first-class *árdati*), *uśá-* 'desire', and *aná-* 'breathe' (inf. *anitum*). Laryngeals are also involved with the stems *dyá-* 'divide, share', *dyá-* 'bind', *śyá-* 'sharpen', and *syá-* 'bind', since these are to the roots *dā*, *dā*, *śā*, and *sā*, respectively. In one of these instances, at least, there must be two laryngeals involved: to *sā* cf. ninth-class *sinā́ti* < **sH̥-n-éH-ti*. And so perhaps *syá-* reflects *sH̥Hé-*: forms of this stem are in fact frequently dissyllabic in the Rigveda, i.e. *siyá-*. This explanation perhaps can be extended to the other three stems. Also to be excluded from consideration in determining the root structure of sixth-class verbs are the obvious transfers from other classes, and characterized stems, e.g. *r̥ṇváti* beside fifth-class *r̥ṇóti* (root *r̥* 'go'), 3. pl. *śiśanti* beside third-class *śiśāti* (*śā* 'sharpen'), and *r̥ccháti* (*r̥* 'go'), from **Hr̥-sk̑é-ti*. This leaves just one biconsonantal stem (Ved. *rante*, to *r̥* 'go') among all the 142 Sanskrit sixth-class verbs. By contrast, biconsonantal stems are quite commonly found in the first class of Sanskrit verbs (comprising, among other types, Brugmann's type A), e.g. *bhárati* (root *bhr̥* 'bear'), *kárati* (*kr̥* 'make'), *háyati* (*hi* 'impel'), and *pácati* (*pac* 'cook'). The coöccurrence of accented theme vowel with weak-grade triconsonantal roots in the sixth class is the same coöccurrence encountered among the thematic aorists, and is due in part to the same accent shift (discussed below, §4.5), though some of these stems presumably already accented the stem-final vowel before the accent shift. This affinity between sixth-class verbs and thematic aorists is perhaps not accidental: the possibility arises that the two formed a single continuous class at the time when there was no formal distinction between presents and aorists, the thematic aorists simply reflecting those verbs of this combined class for which new presents arose. If the two classes were originally identical one might expect to find few or no thematic aorists corresponding to sixth-class presents, and that is in fact the case: of the 108 roots forming sixth-class presents in Sanskrit (excluding stems in *-cha-* < **-sk̑e-* and transfers from nasal and reduplicating present classes), just seven also form thematic aorists. The corresponding proportion in any other present class is not large, but the proportion 108:7

seems exceptional. Moreover, in each of these seven instances (*mucá-*, *mr̥dhá-*, *rá-*, *rudá- ruhá- vr̥ṣá-*, *h[u]vá-*) the sixth-class present is less common than one or more present stems of other types (information based on Whitney 1885), and so the possibility arises that these seven stems are later additions to the sixth class.

The affinity of sixth-class presents to thematic aorists (an affinity recognized, in fact, by Brugmann 1897–1916: 2.3.114) suggests that the theme vowel in the present stem became established the same way as in the aorist, as suggested above (§4.2.1): the vowel is etymological in the singular and in the 3. plural, and analogical elsewhere. As pointed out above (§4.1), the vowel in the 3. plural was not regarded as part of the ending, and so it doubtless played an important role in initiating the thematization of the plural.

Some other thematic verbs may be regarded as pre-syncopic. Most certain are the verbs in **-sk̂o-*, which always have weak roots. The suffix probably was added to the root after apocope, given the evidence of forms like Skt. *pr̥ccháti*, Lat. *poscō*, W *archaf* 'ask' (<**pr̥k-sk̂o-* < **paràk̂-sak̂á-*). The alternative is to suppose that **-sk̂-* was already a cluster in Pre-Indo-European. Persson (1912:315–6, 340) suggests that **-sk̂o-* is merely a further extension of a *s*-suffix found also in the future and the *s*-aorist.

Type A thematics are of little interest here, since they must be post-syncopic formations, arising after ablaut ceased to be conditioned on a phonological basis. This is, after all, a highly productive type, and in Sanskrit, first-class verbs outnumber sixth-class nearly four to one.

4.4. THE PRESENT AND AORIST SYSTEMS: A SYNTHESIS.

The evidence of the preceding sections of this chapter points to the conclusion that neological present stems were formed at the same time that some older stems, all uncharacterized, became aorists. Reduplicated presents, for example, seem to have arisen at the same time that their unreduplicated counterparts became root-aorists (§4.2.1). Clearly there is a causal relationship between the rise of reduplicated presents and the restriction of the corresponding unreduplicated stems to aorist function, probably a push-chain phenomenon. For example, if it is true, as asserted above (§4.3.2), that thematic aorists and type B thematic presents originally constituted a single class, then assumption of a push-chain effect explains why only those stems became aorists to which new presents were created, and the rest simply remained as present stems. To summarize the divergent developments of the original uncharacterized stems, as posited in the preceding sections of this chapter, Table 4.4a illustrates the changes posited, with numbers indicating the section in which each development is discussed.

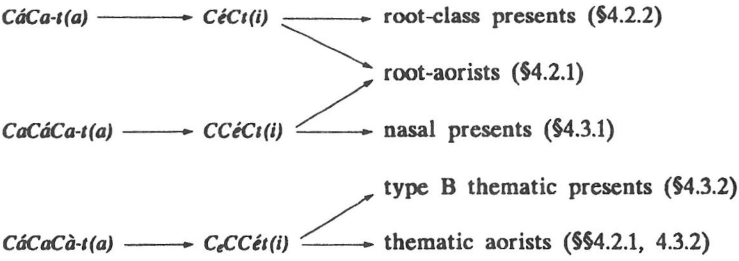

Table 4.4a. The developments of Pre-IE non-apocopated verb stems.

The creation of new present stems has perhaps so far seemed a fairly haphazard affair. For example, reduplicated presents were said to have arisen after the morphologization of quantitative ablaut (§4.2.2),. while the new triconsonantal root-class presents were assumed to be pre-syncopic (§§4.1, 4.3). Some organization may now be brought to this process of neological present-stem formation, by means of the following formula: after apocope, but before syncope, new presents were created, identical to the original stems that had served as both presents and aorists, except that they had consistently suffered apocope, whereas the original stems still preserved a stem-final vowel. So for instance the original stem **ráwadhà-ta* (**ràwadhát* after apocope and the accent shift, eventually giving Vedic *arudhat*) shifts to exclusively aorist use when a new present is formed from an apocopated stem, **ráwadh-t*, eventually giving Skt. *róddhi* (root *rudh* 'obstruct'). Such apocopated presents were formed to all stem types: biconsonantal, and triconsonantal thèmes I and II. The neological apocopated present stem types are illustrated in Table 4.4b, along with their developments. It should be noted that the appearance of nasal presents in both this table and Table 4.4a does not represent a strong claim: it was remarked above (§4.3.1) that because nasal presents consistently reflect thème I roots, it is not clear whether they reflect both apocopated and non-apocopated stems.

$$\begin{tikzcd}
\textit{CáC-t} \arrow[r] & \textit{CéCt} \arrow[r] & \text{reduplicated presents} \\
\textit{CaCáC-t} \arrow[r] & \textit{CCéCt} \arrow[r] \arrow[ur] & \text{nasal presents} \\
\textit{CáCaC-t} \arrow[r] & \textit{CéCCt} \arrow[r] & \text{root-class presents}
\end{tikzcd}$$

Table 4.4b. The developments of Pre-IE apocopated verb stems.

There is extensive explanatory power in the assumption that, before syncope, apocopated stems were used as presents, allowing the corresponding non-apocopated stems to assume specifically aorist function. It accounts, for instance, for an apparent morpheme structure constraint on reduplicated presents: a preponderance of these stems are formed to biconsonantal roots in Sanskrit—30 out of 49 (figures based on Whitney 1885). Most of the remaining 19 can be associated with the root structure *CCeC-*, e.g. Vedic pres. *vivyácat* to *vyac* 'extend'; to Vedic pres. *pīpáyat* cf. fourth-class present *pyā́yate*, root *pī́*, *pyā* 'swell, fatten, fill up'; to Vedic pres. *dī́dhayan* cf. Skt. root-class pres. *dhyāti*, fourth-class *dhyā́yati*, root *dhī*, *dhyā* 'think', etc.[10] Likewise, many of these roots also form nasal presents, again implying the existence of thème II forms. The pattern is not perfectly

[10] The 'root' *mikṣ* 'mix', though classed with this group by Whitney, is actually a desiderative to the root *miś* 'mix' (MacDonell 1910:359 n. 8).

regular—there are perhaps four or five triconsonantal reduplicated stems whose roots are never attested in thème II form, but still there is an unmistakable pattern: reduplicated presents appear originally to have been formed only to roots of the form *(C)CeC-*, never *CeCC-*. The Greek evidence corroborates, and is exceptionless: most of the 24 reduplicated present stems listed by Schwyzer (1939–50:1.686–90) clearly reflect roots of the form *-(C)CeC-*: τίθημι 'place', ὀνίνημι 'help', πίμπρημι 'kindle', etc. A few are ambiguous, showing weak-grade roots (e.g. ἰάχω < *ϝιϝαχω 'shout'), but none reflects a thème I root.

This regularity of morpheme structure among reduplicated presents should not be entirely surprising, considering the evidence offered above (§4.2.2) that the roots of reduplicated presents form root-aorists and not thematic aorists. Roots of the form *(C)CeC-* naturally cannot undergo the accent shift necessary to the creation of thematic aorists. Then in view of the analysis advanced in §4.2.2 that reduplicated presents replaced the original unreduplicated forms when the latter came to be restricted to use as root-aorists, it is only natural that the new reduplicated forms should be to roots of the type *(C)CeC-*. Still, the question remains, why were reduplicated presents formed *only* to this root type? New presents *were* formed from thème I roots (e.g. apocopated Skt. root-class present *róddhi* beside thematic aorist *arudhat*, as explained above), and so why is none of these reduplicated?

The analysis represented by Table 4.4b provides a straightforward solution. When new presents were formed from apocopated stems, there was no danger of confusing them with the original stems, now turned aorist, since the latter had a vowel before the ending, while the former did not. After syncope, however, aorists of the type *CáCa-t(a)* fell together with the apocopated presents of the form *CáC-t*, both giving *CéCt*. Likewise original *CaCáCa-t(a)* fell together with apocopated *CaCáC-t*, both giving *CCéCt*. Accordingly, after syncope new presents had to be adopted for both of these root types, and reduplicated stems were chosen for the purpose. On the other hand, syncope did not eliminate all formal distinction between aorists of the form *CáCaCà-t(a)* (giving *C*$_e$*CCét* after apocope, accent shift, and syncope) and apocopated presents of the form *CáCaC̦-t* (giving *CéCCt*), and that is why reduplicated presents are not formed to thème I roots. This solution clears up a nagging problem of chronology: it was argued above that reduplicated presents must have been formed after the morphologization of quantitative ablaut, in view of their anomalous Vedic accent (§4.2.2); and yet all the other indicators examined so far suggest that although new presents could be created at any time, it was before syncope that new presents were created specifically to replace forms that had become aorists. That, for instance, is what the analysis of Skt. *róddhi* and *arudhat*, above, suggests, as well as the regular correspondence of the place of the Vedic accent with the one full-grade vowel in any form of athematic presents indicative. It is now possible to understand this chronological discrepancy, since this analysis provides a reason for reduplicated presents to have arisen only after syncope.

Another difficulty that this explanation resolves is the necessity of assuming a chronological disparity between root-class presents formed from thème I roots and those formed from biconsonantal roots. It was assumed above (§4.2.2) that some if not all root-class presents formed from biconsonantal roots are old, created before apocope (e.g. **esti* < **[H]ása-t[a]*), while all those formed from thème I roots are necessarily post-apocopic (e.g. Skt. *róddhi*, above). This division will seem artificial and unconvincing as long as it has no motivation other than to make the root-class presents give the correct results under syncope. Now, however, there is a clear reason for the division: thème I roots in the root-class presents *are* all post-apocopic, because no pre-apocopic stem *CáCaCa-* could have remained as a root-present. Rather, the accent always shifted in such stems, and so these pre-apocopic forms have all been divided between the thematic aorists and the type B thematic presents. On the other hand, most if not all biconsonantal root-class presents *are* pre-apocopic, since no apocopated biconsonantal root-class present could have remained, all of them having been replaced after syncope by reduplicated stems. The implication is, too, that all biconsonantal root-class presents are stems to which no new presents were formed before syncope—otherwise they would have become aorists. Evidence that many biconsonantal root-class presents do not in fact have corresponding aorists (precisely because these forms themselves never became aorists) was presented above (§4.2.2).

One more phenomenon that this analysis helps to explain is the proliferation of the *n*-infix as a morphological indicator of presential function. It was argued above (§4.3.1) that the nasal infix originated as a device for alleviating the phonetic difficulties presented by certain initial consonant clusters that resulted from the application of syncope. However, not all nasal presents involve such difficult initial clusters—e.g., **tred-* in Skt. *tṛṇátti* ought not to have posed any special problem. Under the present analysis, however, it is clear that syncope threatened to eliminate any formal distinction between aorist stems of the form *CaCáCa-* and the apocopated stems *CaCáC-* that replaced them in the present system. Therefore infixed *-n-*, though originally phonologically motivated, became a tense marker, in the same way that reduplication did, and spread to other thème II stems.

It is perhaps possible to explain why the new presents were formed from apocopated stems, in opposition to the non-apocopated aorist stems. The present system is generally regarded as younger than the aorist: all would agree that the characterized stems of the present system are historically younger than the uncharacterized aorist stems; so, too, the uncharacterized apocopated present stems are also most likely younger. After the application of apocope, all new stems added to the verb system, unless they originally had stem-final accent, were necessarily apocopated. (Perhaps *s*-aorists were formed for these stems, after the distinction arose between present and aorist forms.) Naturally, then, on the model of this new type of stem, apocopated forms might easily arise, as back-formations, for the older non-apocopated verb stems, and the coexistence of apocopated and non-apocopated forms of the same stem led to specialized functions for each, the former serving as presents and the latter as aorists. Note, however, that as the use of apocopated stems began to spread throughout the present system and acquire the function of tense signification, not all the older, non-apocopated verb stems acquired apocopated by-forms: in many instances there was no need, particularly in a case like that of the verb 'be'. And so wherever an apocopated stem did not arise beside it, the older, non-apocopated stem continued to serve in an unmarked capacity with respect to tense. Syncope of course entirely disrupted this relatively simple system, eradicating any distinction between the present and aorist forms of many stems, thus necessitating the use of morphological devices like reduplication, nasal infixation, and primary endings (the latter two devices having originally been phonologically motivated) to preserve a distinction between present and aorist forms.

4.5. INJUNCTIVE AND OPTATIVE FORMS, AND THE ACCENT SHIFT. The Vedic injunctive serves as a form of the verb unmarked for tense and mood, as first demonstrated by Thurneysen (1883)—for further references see Kiparsky (1968:36). Roughly a third of the injunctive forms encountered in the Rigveda are conjoined to verbs fully marked for tense and mood, and Kiparsky explains the use of the injunctive in such constructions as due to a kind of identity-deletion transformation often called 'conjunction reduction': an injunctive in such a construction is understood to share the values for tense and mood of the preceding conjoined verb. A Rigvedic example Kiparsky gives (1968:37) is: *nū́ cit sá bhreṣate jáno ná reṣan máno yó asya ghorám āvívāsāt* 'that man does not falter nor suffer harm, who seeks to win his terrible spirit' (7.20.6), where *bhreṣate* is present indicative, and *reṣan* is injunctive.

The relationship posited in this chapter between the present and aorist systems accounts rather well for how the injunctive came to be used in this manner. Being augmentless, and carrying secondary endings, the injunctive is, after all, identical in form and similar in function to the category of Pre-IE verbs that served both present and aorist function. In particular the use of secondary endings with the injunctive is puzzling unless it is understood that the present in a synchronic grammar of Vedic Sanskrit is more marked than the injunctive, and this synchronic situation is the result of the historical derivation of present forms from the simpler forms reflected as injunctives and uncharacterized aorists. The injunctive's unmarked value for tense is then very archaic. Of course the injunctive category in Vedic Sanskrit includes many neological additions, e.g. injunctives corresponding to reduplicated and type A thematic presents (i.e. unaugmented imperfects) indicative. There is even a very small number of injunctives formed to perfect stems, though etymologically the injunctive is entirely foreign to the perfect system, belonging originally to that common ground that lies between the present and aorist systems—this analysis then explains why perfect injunctives are so rare. And as might be expected, given this analysis, injunctives formed to aorist stems are about twice as common as those to imperfect stems, the latter being more commonly later innovations.

Since the imperative and the subjunctive are post-syncopic creations, the injunctive's unmarked status with regard to these moods must be an acquired characteristic. However, the use of injunctives in coordination with subjunctives and imperatives must have had a model in its use in coordination with optatives, since the optative is pre-syncopic. The unmarked status of the injunctive with regard to mood, at least as far as the optative is concerned, can be traced to a very old, pre-syncopic identity-deletion rule. The optative suffix is *_-yeH-_, which originally appeared in weak grade in all forms except the active singular of athematic verbs. In Vedic Sanskrit the full-grade form has been extended throughout the active athematic paradigm: the original paradigmatic alternation is evident in the Old Latin and Greek present optative paradigms of *_es-_ 'be', e.g. 1. sg. *_s-yeH-m_ in OLat. _siem_, 1. pl. *_s-iH-me-_ in _sīmus_. The corresponding Greek forms are εἴην and εἶμεν, in which the full-grade form of the root has been substituted, as Szemerényi (1980:240) remarks, as indicated by the evidence of the other reflecting languages: cf. Vedic _syā́m_. Then if the present optative of 'be' had *_s-_ throughout the paradigm, it must be assumed that the optative is, reasonably enough, a post-apocopic formation: Pre-IE *_Hàsa-yáHa-_ would yield *_H_$_e$_syéH-_; *_Has-yáH-_, however, properly yields *_(H)syéH-_.

In Sanskrit the optative suffix is reflected as both _-yā-_ (<*_-yeH-_) and _-e-_ (or _-ey-_ before vowel, both from PIE *_-e-yH-_). The former is found with athematic stems, both present and (non-sigmatic) aorist, and the latter with thematic ones. (Note, however, that in the latter instance the theme vowel comes before the optative suffix, and there is no theme vowel between the optative suffix and the desinence.) The former group is quite regular: e.g., Rigvedic root-aorist 2. sg. opt.

ṛdhyām reflects Pre-IE **Hàladh-yáHa-m*, in which the optative suffix properly carries the primary word accent, either because of polytony or because of the accent shift in verbs. On the other hand, Vedic thematic aorist 3. sg. opt. *ṛdhet*, to the same root in the Atharvaveda, seems to reflect **Hàladhá-yaH-*, where primary accentuation of the root-final vowel is unexpected. It will be difficult to explain such doublets without assuming one or the other form is a transfer, since the results of this study have indicated that thematic and athematic aorist forms ought not originally to have existed to the same root. In that event the thematic form is suspect, especially since the thematic aorist optative is rare (as remarked by MacDonell 1910:372) and largely post-Rigvedic, and beside the thematic optative forms there are many precisely parallel athematic forms, e.g. 1. sg. *śakyām* (Rigveda) beside *śakeyam* (Khilas; root *śak* 'be able'), 2. sg. *gamyaḥ* (Rigveda) beside *gameḥ* (Vājasaneyi-Saṃhitā; root *gam* 'go'), 1. pl. *ṛdhyāma* (Rigveda) beside *ṛdhema* (Atharvaveda; root *ṛdh* 'thrive'), and several others. The frequency of such doublets is especially surprising considering the rarity of the thematic aorist optatives. Very likely, then, such thematic aorist optatives were formed from indicative thematic stems by the addition of the optative suffix in weak grade, the grade it originally had everywhere except in the active singular. This is an entirely natural development, because if originally there were no thematic aorist optatives, then all thematic aorists had anomalous athematic optatives in opposition to completely thematic paradigms in the other moods. Thus also the possibility arises that thematic optatives in the present system have a similar post-syncopic origin. What makes this analysis probable is the fact, pointed out above, that the theme vowel appears before rather than after the optative suffix, which is surely difficult to explain otherwise.

It must at any rate be assumed that a great deal of analogical building attends the formation of optatives. For example, a reduplicated present optative like Vedic *mamanyāt* (*man* 'think') must be analogical to the indicative, since the original optative would be reflected as **manyā́t*; but this latter doubtless would have been regarded as an aorist optative, since the original unreduplicated stem of the indicative had assumed exclusively aorist function. Such shifts across tense boundaries are no doubt the reason that optatives are formed to present, aorist, and perfect stems in Vedic without any detectable difference of meaning—the present and aorist optatives, at any rate, were identical in meaning from the very start, and simply never became differentiated semantically in Vedic.

Finally, the question was left unanswered above (§§4.2.1, 4.3.2) under what conditions the accent shifted, since it certainly did shift in thematic aorists and type B thematic presents. It can now be seen, after this discussion of the optative, that there are no forms of pre-syncopic origin that contradict the assumption that the accent shift was general, affecting all finite verb forms, as long as the shift is dated after apocope. Whether the shift antedated or followed the first stage of syncope is difficult to say. If the shift followed syncope, then the rule was that the accent shifted to the last remaining vowel in the word: for instance, *_ráwadhà-t_ is syncopated to *_ráwdhàt_, and then the accent shifts, giving *_ràwdhát_ > *_r_$_e$_wdhét_, and eventually Skt. aor. _arudhat_. If, however, the shift occurred before syncope, then the rule was that the primary stress shifted to the last stressed vowel of the word if that vowel had only secondary stress. Neither possibility seems intrinsically more natural than the other.

CHAPTER FIVE: SUMMARY AND PERSPECTIVES

5.0. SUMMARY. It is certain that Proto-Indo-European had a pitch accent, and yet it is also consensus opinion that this pitch accent developed out of an earlier stress accent (§1.5). There is no other convincing way to account for the rise of syllabic consonants and the subsequently morphologized alternations between full and weak grade that constitute Indo-European quantitative ablaut: in natural languages, the reduction and loss of vowels on such a grand scale occurs only in the unstressed syllables of words with stress accent, and so stress-related syncope is also generally assumed to have affected the Indo-European protolanguage. The thesis of this study is that this syncopic process can be defined precisely: the rules can be formulated with precision, and so by internal reconstruction it is possible to gain a general idea of the phonological structure of Pre-Indo-European, the language out of which Proto-Indo-European evolved.

The first chapter examines what is already known or suspected about the nature and origin of syllabic consonants in Proto-Indo-European, concentrating on the controversy (§§1.1–1.6) between advocates of the Sonantentheorie (the standard Brugmannian analysis) and those who would analyze some or all PIE syllabic consonants as monophonematic units with two discrete phonetic elements, a consonant with an accompanying nonphonemic vocoid—e.g., *$_{e}H$ and *H_{e} are both syllabic allophones of */H/. It is concluded (§1.6) that on theoretical grounds the notation *$_{e}H/H_{e}$ is unlikely because there is no apparent way to predict which of the two allophones ought to appear in a given environment; and if either allophone may appear, then this notation is hyperanalytic, and the more abstract notation *$\underset{\circ}{H}$ must be preferred, regardless of which notation has a better claim to phonetic accuracy. In other words, if either allophone may appear randomly between consonants, then to write one is wrongly to exclude the other, and so Brugmann's notation, which subsumes both allophones, is to be preferred. There remains, however, a certain plausibility to the notation *$_eH/H_e$ since, as Henry M. Hoenigswald has shown (1965), analysis of syllabic consonants into discrete syllabic and nonsyllabic phonetic units reveals a regular pattern of biconsonantal clusters underlying the Edgertonian syllabicity patterns of Proto-Indo-European. And so although the notation *$_eH/H_e$ is not admissible on a synchronic basis as a representation of syllabic laryngeals in late Proto-Indo-European, it does perhaps reveal an underlying diachronic truth about quantitative ablaut. Two theories have been proposed to account for the origins of the syllabicity patterns of entire words in Proto-Indo-European, the theories of Hoenigswald and Carl Hj. Borgstrøm (1949, 1952, 1954a, 1954b). These views are examined (§1.5-1.7), and it is concluded that the iterative nature of syllabicity assignment proposed by both theories is credible, while the mechanisms proposed are not, primarily because neither theory links the process to syncope. (Borgstrøm at first proposed a certain amount of syncopic conditioning, but later abandoned that portion of the theory.) Rather, a credible explanation must rely on syncope because it is almost universally agreed that the rise of quantitative ablaut is to be attributed to some syncopic process.

Against this theoretical backdrop, then, a theory of iterative syncope in Pre-Indo-European is proposed (§1.9). The process was quite similar to that encountered in some natural languages, the most intensively studied of which is Old Irish (§1.8). An ambidirectional iterative rule assigned secondary stress (`) to every second vowel before or after the one vowel bearing primary stress (´). Thereupon, all unstressed vowels were syncopated, and as a result, secondary stress was lost, since it was now nondistinctive. Then all vowels without primary stress were reduced to *$_e$ (presumably [ə]). When *$_e$ and a flanking resonant appeared between consonants, the two combined to form a syllabic consonant; in nearly all other environments *$_e$ was restored to full grade. So for instance beginning from a hypothetical Pre-IE form **paratanákataspayas* (where *a* stands for any Pre-IE vowel, the quality and quantity simply being unknown), the secondary stress rule will produce **paràtanákatàspayàs*, which syncope will reduce to **pr*$_e$*tnékt*$_e$*spy*$_e$*s*. Then the rise of syllabic consonants and the subsequent restoration of all remaining instances of *$_e$ to full grade will convert this form to PIE **pr̥tnéktespis*. The remainder of the book is devoted to demonstrating the explanatory power of this hypothesis.

Chapter Two examines what is termed SIMPLE athematic declension. It begins (§2.1) with a discussion of what may be assumed about PIE declensional endings—what the comparative evidence indicates, what areas of disagreement remain, and what will be assumed in this study in regard to disputed matters—since this is naturally a prerequisite to internal reconstruction. (The set of endings adopted represents largely a compromise between the endings reconstructed by Oswald Szemerényi 1980 and C.-J. N. Bailey 1970.) Then the root-stems are examined first (§2.2), not because the evidence they provide is the most striking, but because with them it is easiest to demonstrate how syncope worked. One of the more interesting observations that emerges from the discussion of the root-stems concerns the ending of the accusative singular, since most comparatists reconstruct it as consistently syllabic **-m̥*, while the theory of iterative syncope projects a nonsyllabic **-m* in most root-stems. In fact on theoretical grounds it ought to be assumed, anyway, that the ending was not *underlyingly* syllabic, since that assumption grants syllabic **m̥* the status of a phoneme rather than an allophone of */m/. On practical grounds, too, however, the assumption of nonsyllabic **-m* in the accusative singular of root-stems is plausible, since it has always been necessary to resort to analogy to explain the accusative singular ending. For instance, PIE **-m̥* clearly gives Skt. *-a* (as in *saptá* 'seven' and *dáśa* 'ten'), yet the Sanskrit athematic accusative singular ending is *-am*. For that very reason de Saussure (1879) suggests that the Proto-Indo-European accusative singular ending ought to be reconstructed as nonsyllabic, vocalized dialectally, which is essentially what the syncope theory claims. This chapter suggests also that some interesting evidence for a nonsyllabic accusative singular ending comes from root-stems in *-m-*, e.g. Avestan acc. sg. *ząm* 'earth' and *zyąm* 'winter', from (perhaps) **dhĝhōm* and **ĝhyōm*, respectively. Here the lengthened root vocalism reflects compensatory lengthening upon the reduction of a following geminate consonant, a regular process proposed by Szemerényi (1960, 1962, 1980) to account for lengthened grade in other environments.

The remainder of the second chapter is devoted primarily to the *i-* and *u*-stems, which furnish stronger justification for positing iterative syncope (§2.3). Szemerényi (1980) is almost certainly right that the distinction between open and close inflection of the *i-* and *u*-stems is somehow related to syllable weight, e.g. (using Hoenigswald's syllabicity notation) heavy root syllable in close-inflected Vedic nom. sg. *matíḥ* 'thought' (<PIE **m$_e$ntis*), gen. *matéḥ* (<**m$_e$nteys*), but light root syllable in open-inflected nom. *áviḥ* 'sheep', gen. *ávyaḥ* (<**Hewyos*). The Pre-IE genitives were **mánatà-ya-s* and **Háwa-yà-s*, giving **mántàys* and **Háwyàs* after syncope. Thereupon the primary accent shifted to the final syllable in the weak cases (to bring this class into line with other athematic stem classes), resulting eventually in PIE **m$_e$ntéys* and **H$_e$wyós* (>**Hewyos* by generalization of the strong stem throughout the paradigm). Corroboration is found in anomalous genitives of diphthongal stems (which are nearly identical in origin to *i-* and *u*-stems), Vedic *góḥ* 'head of cattle' (=Av. *gāuš*) and *dyóḥ* 'heaven; day' (=Av. *dyaoš*). Here the accent was incapable of shifting after syncope in Pre-IE **g^{w}áws* < **g^{w}áwa-s* and **dyáws* < **dayáwa-s*, while it was capable in the etymon of Vedic gen. *nāváḥ* 'ship' (<PIE **neHwós* < Pre-IE **nàHwás* < **náHwà-s* < **náHawà-s*).

As the reconstructions in the preceding paragraph demonstrate, an important claim of the second chapter is that the full-grade vowels of weak-case endings originally belonged to the stem rather than the desinence (§2.2). So for instance although the genitive ending is definitely -ος rather than -ς in Gk. gen. τριχός 'hair', the Pre-IE form was **dharàyaghá-s* (not ***dharàyagh-ás*). This analysis is based on two observations about Proto-Indo-European morpheme structure. PIE root morphemes that begin with a vowel are either rare or (as many believe, who reconstruct all such roots with initial laryngeals) nonexistent. That all weak-case desinences began with a vowel then seems rather peculiar, especially since the case endings, like root morphemes, are generally assumed to have been separate words at one time. (The middle cases are disregarded in this study, since they are widely regarded as late innovations.) At any rate, the difference of morpheme structure between root-morphemes and weak-case desinential morphemes is so consistent that historically it must have a phonological explanation. An additional peculiarity of the declensional endings is that although all weak-case endings begin with a vowel, none ends with one. There is then the implication that all unstressed final vowels were eliminated by phonological rule at some point in the development of the protolanguage. If, at any rate, it is true that the full-grade vowels that begin weak-case endings originally belonged to the stem rather than the ending, then apocope of final vowels is an inevitable assumption: if the desinences were separate words at one time, a reconstructed desinence such as gen. *-*s* is unlikely to have been a separate word originally unless it has lost a vowel. It is assumed then that the apocope of final vowels in Pre-Indo-European preceded the application of syncope.

Chapter Three begins with a hypothesis about the Pre-IE accent, intended to explain alternations in the place of the primary accent (§3.1). Just as in Classical Greek, there were three types of words in Pre-Indo-European, classifiable according to their accentual behavior: some carried no accent at all (referred to as ATONIC CLITICS, comparable to Greek proclitics); some threw their accent onto the last syllable of the preceding word (TONIC CLITICS, like Greek enclitics); and some carried their own accent regardless of syntactic environment (NON-CLITICS, like Greek major class words). The classification of words in this manner corresponds to the degree of accentual prominence accorded each word class in attested IE languages. So for instance the atonic clitics tend to belong to categories of words with low accentual prominence in the sentence in IE languages (such as enclitic pronouns), while the non-clitics tend to be major class words such as substantives, adjectives, and non-finite verbs, with the tonic clitics occupying the accentual middle ground (e.g. postpositions and some adverbs).

What is perceived in Proto-Indo-European as alternation in the place of the accent between stem and suffix in declensional paradigms is attributable to the accentual properties of the Pre-IE words that the PIE case-endings reflect. So for example PIE acc. sg. **snoigʷhm̥* 'snow' reflects Pre-IE **(s)náyagʷhà-ma*, where **-ma* is an atonic clitic (presumably a pronoun, the general opinion), while PIE gen. **snigʷhos* reflects Pre-IE **(s)nàyagʷhá-sa*. Here **-sa* is a tonic clitic (presumably a postposition) which has thrown its accent onto the last syllable of what was originally the preceding word. The stem was originally **(s)náyagʷha-*, as in the nominative, but when the last syllable became accented, the first accent was eliminated, under the principle that a sequence of morphemes in close juncture ought to have just one primary accent (the principle of POLYTONY). So gen. **(s)náyagʷhá-sa* became **(s)nàyagʷhá-sa* under polytony followed by the assignment of secondary stress. Polytony is a common phonological process in natural languages, and is even found at later stages in Indo-European development, e.g. in the accentual treatment of the verbal augment.

At this point it becomes necessary to distinguish between simple and complex declensional stems: words in simple stem classes carry a single primary accent in Pre-Indo-European, while complex stems may carry more than one because their stems are composed of more than one non-clitic word in Pre-Indo-European. So for instance PIE **bhreH-ter-* 'brother' reflects Pre-IE **bharáHa* plus **tára*, both non-clitics. The *n*-stems (§3.2) and *r*-stems (§3.3) are then examined as typical complex stems. The *n*-stems provide particularly good evidence for the claim that *$_e$ was restored to full grade wherever it could not combine with a flanking resonant or laryngeal between consonants to form a syllabic consonant, though the point is also readily demonstrable from the root-stems. Next the thematic stems are examined (§3.4), and it is concluded that the earliest stems are of two types: those with full-grade root vocalism were originally uninflected, while those with weak-grade root vocalism originally had columnar accent, in opposition to the variable accent of athematic stem types. The *ī*- and *ū*-stems, which are closely related in origin to the thematic stems, are then examined, and, as might be expected, it is demonstrated that the difference between the *devi*- and _vr̥ki_-types is attributable to causes similar to those that gave rise to the distinction between open- and close-inflected _i_- and _u_-stems. Iterative syncope accounts not only for the difference between the _devī_- and _vr̥ki_-types, but also for the fact that the two types, in separate ways, are the most prominent exceptions to Sievers' law in Indic. Moreover, the _ī_-stems provide evidence that the earliest thematic stems had just one full-grade vowel in the stem: in stems with reduced-grade roots it was the theme vowel, while stems with full-grade roots originally had no theme vowel. Finally the _s_-stems are considered (§3.5), and it is argued, partly on the basis of the evidence of Caland's suffixes, that they are in origin based on the same types of formations that produced the thematic stems.

Chapter Four concerns conjugation. The discussion is limited practically to the present and aorist systems, since the perfect and future systems appear to be post-syncopic innovations. Several surprising constraints on present and aorist stem types are pointed out. For instance, with a rather small number of exceptions, nearly all of which have transparent explanations, biconsonantal roots form root-aorists in Sanskrit, and not thematic aorists (§4.2.1). Triconsonantal roots may form either root-aorists or thematic aorists in Sanskrit, but the Greek evidence suggests that in Proto-Indo-European triconsonantal root-aorists were limited to the thème II type (to use the terminology of Benveniste 1935), and thème I root-aorists are an Indo-Iranian innovation (probably starting from the passive indicative root-aorist, a different formation altogether, and peculiar to Indo-Iranian). This distribution is comprehensible under iterative syncope if it is assumed that the accent shifted to the last vowel in the verb after syncope: thus triconsonantal roots might form thematic aorists (e.g. Pre-IE 3. sg. *_ráwadhà-t_ > *_ráwdhàt_ > *_ràwdhát_ > *_r_$_e$_wdhét_ > *_rudhet_, and with the addition of the augment, eventually giving Vedic _arudhat_), while biconsonantal roots could not (e.g. Pre-IE 3. sg. *_g_^{w}_áma-t_ > *_g_^{w}_ámt_, eventually giving Vedic root-aorist _ágan_). This accent shift is found to have applied to all finite verbs formed in Pre-Indo-European. Another distributional peculiarity of PIE conjugation is that reduplicated presents generally correspond to root-aorists, almost never to thematic aorists, and syncope also provides an explanation for this distribution.

The present and aorist systems are widely believed originally to have been undifferentiated (see, e.g., Brugmann 1897–1916:2.3.44). The implication of this assumption is that historically the present system is actually younger than the aorist, since present stems carry affixes not attached to aorist stems, and so are later derivations from the more primitive stems reflected in the aorist. Historically it seems peculiar that the present system should be younger than the aorist, which is surely the more marked category. Rather, if originally the present and aorist were formally undifferentiated at the word level, a likely explanation is that the forms reflected in the PIE aorist originally fulfilled both present and aorist functions, and became relegated to aorist use only when new stems with specifically presential meaning arose to take their place. A synthesis of such distributional peculiarities as mentioned in the preceding paragraph leads to the conclusion that the rise of those specifically presential stems has its origin in a straightforward and almost inevitable phonological process (§4.4). The earliest verb stems (reflected in the aorist) were formed before apocope; and so whenever, after apocope, new stems were added to the verb system, there was a formal difference between the new stems and the older ones: the former, unlike the latter, had no vowel before the endings. With this model in place, apocopated stems were formed beside their older, non-apocopated forms, the morphological difference was exploited for its value as a tense distinction, and thus arose the distinction between the present and aorist systems. That the athematic present system includes apocopated stems explains why, for instance, triconsonantal clusters are found in verbs in the present, but not in the asigmatic aorist (once dialectal innovations are eliminated). Syncope then threatened to eliminate the distinction, in many stems, between presents (apocopated) and aorists (non-apocopated), and so various morphological devices such as *n*-infixation (§4.3.1) and present-tense reduplication (§4.4) came to be employed to preserve the tense distinction. What renders this explanation plausible is that such morphological devices can be shown originally to have had purely phonological motivations resulting from syncope itself.

5.1. THE STRUCTURE OF PRE-INDO-EUROPEAN AND LINGUISTIC TYPOLOGY. Throughout this work, emphasis has been laid on demonstrating the naturalness of Pre-IE phonology, as reconstructed here, by reference to linguistic typology, pointing to parallels in natural languages. Perhaps the chief remaining difficulty with this theory of iterative syncope is once again a question of naturalness, pertaining to the syllable structure of Pre-Indo-European. With the exception of the word for 'star', assumed to have been borrowed from Semitic (§3.3.3), all Pre-IE forms reconstructed here have consistently had optimal syllable structure (*CVCVCVCV*...) before apocope. Such uniformity might perhaps seem unnatural, but consistently open syllable structure does occur in natural languages, e.g. in Hawaiian, along with all the other Polynesian languages, excluding six languages of Outlier Polynesia, though even there, forms with consonant clusters are to be derived from underlying forms with open syllable structure (see Krupa 1982: 32–4). How do languages acquire such traits? In the case of Polynesian it is a matter of the simplification or elimination of consonant clusters in the protolanguage, since many Proto-Austronesian bases are to be reconstructed as containing consonant clusters.[1] So, too, Pre-IE syllable structure may also be attributed to the simplification of consonant clusters. If, say, the composition of consonant clusters never varied, then the difference between certain consonant clusters and unitary, complex consonantal phonemes might easily be eliminated. So for instance, if /b/ and /h/ appeared as a cluster in a word, and never under any sandhi conditions were they separated by a vowel (nor, apparently, under any sandhi conditions would such a cluster not be flanked on both sides by vowels, given the assumptions advanced here about Pre-Indo-European), then /bh/ in such a word might come to be regarded as a unitary phoneme, especially if /b/ or /h/ underwent phonological change in other environments. The existence of complex consonant phonemes in Proto-Indo-European would then lend support to the reconstruction of Pre-Indo-European rendered here (though the absence of such would constitute no counterevidence—cf.

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[1] See Dahl 1977:10-1; and for specific examples of Proto-Austronesian consonant clusters reduced to unitary phonemes in Proto-Polynesian see Dempwolff 1937:191-2.

Proto-Polynesian, with its thirteen consonant phonemes, none with secondary articulations, and none more complex than the velar nasal).

There are of course complex consonant phonemes with secondary articulations generally reconstructed for Proto-Indo-European. The existence of PIE palatal (<palatalized) and labiovelar consonants is probably not relevant here (see below), but the voiced aspirates are the sort of consonant that might well result from the simplification of invariant consonant clusters. However, there is perhaps more compelling evidence to be derived from what is known as 'the problem of the IE interdental spirants'. There are some consonant clusters in the IE languages that resist precise reconstruction in Proto-Indo-European: examples are Greek -κτ- corresponding to Skt. _-kṣ-_ (e.g. Gk. τέκτων : Skt. _tákṣan-_ 'carpenter'; and Gk. ἄρκτος : Skt. _ŕ̥kṣa-_ 'bear') and Gk. -φθ- corresponding to Skt. _-kṣ-_ (e.g. Gk. φθείρω 'spoil' : Skt. _kṣárati_ 'flows'; and Gk. φθίνω: Skt. _kṣinóti_ 'perishes').[2] The former of these clusters cannot be reconstructed as either *_-kt-_ or *_-ks-_, since these have other reflexes in Greek and Sanskrit—cf. Gk. ὀκτώ, Skt. _aṣṭā́, aṣṭāú_ 'eight'; and Gk. δεξιτερός, Skt. _dakṣiná-_ 'right'. And so Brugmann (1897–1916:1.2.790–3), followed by many others, reconstructs two dental fricatives for Proto-Indo-European, voiced and voiceless (presumably allophones), deriving, for instance, τέκτων from *_tek̂þ-_. Another solution has been to reconstruct a unit phoneme rather than a cluster: so for instance Cuny (1914) and Benveniste (1937b) both derive τέκτων from *_tek_^{s}-, where *_k_^{s} represents a unitary affricate phoneme. Brugmann's solution has generally been preferred, and that is peculiar, since structurally Cuny and Benveniste's solution is certainly superior. Underlying Brugmann's solution must be the assumption that /þ/ has disappeared or merged with some other phoneme in all other environments. Therefore, unless *_þ_ can be shown to be an allophone of some more familiar PIE phoneme (and clearly the assumption is that it cannot, or the symbol /þ/ would be discarded immediately), it must be concluded that *_k̂þ_ constrasts with all sequences of two phonemes, and so can only be regarded as a unitary phoneme,

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[2] The material has been extensively discussed. For references see Schindler 1967.

since *_þ_ occurs in no other environment. To draw an apt comparison, no one would think of claiming that there is a phoneme /ʒ/ in Bengali: the sound [ʒ] occurs only as part of the affricate phoneme (roughly) /dʒ/; and in fact in foreign borrowings the sounds [z] and [ʒ] are pronounced as the affricate phoneme (Chatterji 1926:1.477).

Another solution was mentioned above (§2.2): on the basis of comparison of Hitt. _tekan_ and Toch. A _tkaṃ_ to Gk. χθών and Skt. _kṣā́m_ 'earth', Kretschmer (1932) reconstructs PIE _dh(e)ĝhom-_, and asserts that some but not all apparent instances of PIE interdental spirants derive from PIE stop clusters. Metathesis in the cluster *_dhĝh_ is natural, at least in Greek, where the latter of two nongeminate stops must always be dental: cf. τίκτω 'bear, produce', from *τι-τκ-ω. There is also an apparent correspondence between Hitt. _ḫartagga_, which denotes some unidentified beast of prey, and Skt. _ŕ̥kṣaḥ_, Gk. ἄρκτος etc. 'bear', which may then be derived from PIE *_Hr̥k̂tos_. Thus Brandenstein (1936:27–30) suggests that all apparent instances of PIE dental spirants arose in stop clusters, and Merlingen (1957) refines the point, limiting the PIE clusters to the type dental + velar.

This is an attractive hypothesis, and compatible with iterative syncope, as demonstrated above (§2.2). Nor are there any dental + velar stop clusters in the IE languages that are not attributable to dialectal developments, as far as I am able to ascertain. But there remain difficulties. The correspondence among Skt. _tákṣan-_, Gk. τέκτων 'carpenter', Lat. _texō_ 'weave, construct', etc., is particularly difficult to account for. Merlingen (1957:60) reconstructs a root *_tetk̂-_, but this reconstruction violates a constraint on PIE root structure: a root may not contain two identical stops (Szemerényi 1980:92). Brandenstein (1936:29) also reconstructs *_tetk̂-_, assuming this is the reduplicated form of a root *_tek̂-_ in zero grade; but this *_tek̂-_ is nowhere attested, and it would be surprising if it had been replaced in all instances by the reduplicated verb stem. In addition, there appears to be a Hittite cognate, _takš-_ 'join, build, do' (where _kš_ could represent either two phonemes or an affricate), that at least discourages the reconstruction _tetk̂-_. Benveniste (1937b:140) raises a telling objection to the reconstruction *_k̂þey-_ (in Gk. κτίζω, Skt. _kṣéti_ 'inhabits') that may also be applied to *_tk̂ey-_: such extended roots imply the existence of unextended **k̂eþ-* or **tek̂-*, neither of which is in evidence. An additional difficulty is that if Merlingen is right, the development of the equivalent of a 'dental spirant' surely ought to be expected in the PIE decad-forming suffix **-k̂ont/-k̂n̥t* < **-tk̂(o)mt* < **-dk̂(o)m-t*, and in **k̂m̥tom* 'hundred' < **tk̂m̥tkom* < **dk̂m̥dk̂om*. Certainly the results of this investigation into iterative syncope lend support to Benveniste's structural observations, since Skt. *-kṣ-*, when it reflects **-kþ-*, has in various places in this study been seen to function structurally as a unit rather than a cluster. So for instance in Table 4.3.1 there is the root *kṣe* 'inhabit', which falls under type III in the table if *kṣ* reflects a cluster rather than a unit. However, since the point of the table is to demonstrate that type III is exceedingly rare and probably an innovation, then statistically it is more likely that *kṣ* here reflects a unitary phoneme, and the root *kṣe* therefore actually belongs with type II. Since the other two roots listed under type III were shown almost certainly to be innovative late additions to the present system (these roots being represented only by imperatives of disputed origin), if *kṣ* is regarded as reflecting a unitary phoneme it follows that type III roots are nonexistent among Sanskrit root-class presents, as one should expect from the conclusions of this study.

The problem of the PIE interdental spirants is almost inevitably linked in many studies to the problem of Mycenaean, Cypriot, and Homeric Gk. πτ- corresponding to π- in other dialects, and to *p-* in other IE languages, e.g. Hom. πτόλις 'city', Skt. *pū́r*, Lith. *pilìs* 'citadel'; and Hom. πτόλεμος : Att. πόλεμος 'war', Goth. *us-filma* 'astonished', OIcel. *fálma* 'flinch' (for others see Schwyzer 1939–50:1.325). Thus, for instance, Lejeune (1972:39–40) suggests a unitary phoneme $*p^s$, and Merlingen (1957) reconstructs a cluster **tp*. Neither hypothesis is intrinsically improbable, though the latter does result in some fairly unwieldy reconstructions: e.g., πτόλις must be derived from the stem */ptlHy-/, and Skt. *pā́rṣṇi-*, OE *fiersn* 'heel', Lat. *perna* 'ham' (cf. Hom. πτέρνη 'heel') would require */pteHrsn-/. Benveniste's objections to the reconstruction of PIE dental spirants can also be applied to Merlingen's analysis here, since probable ablaut variants are not in evidence: the root **tep-* 'strike' from which Merlingen derives πτόλεμος is not attested outside of Balto-Slavic, and the original meaning 'strike' is questionable there (see Trautmann 1923:319), as is a connection among πτελέα, πελέα 'elm' and Lat. *pōpulus*, OCS *topolь* 'poplar' (see Pokorny 1959:1.847). In these instances Anatolian provides no supporting evidence: to Gk. πτέρνη cf. Hitt. *paršina* (for *paršna*) 'loin, thigh'.

These matters cannot be settled here, especially since the choice of solutions is of some consequence, the competing solutions having wider implications—e.g., if Merlingen is right, his analysis casts doubt on the claims of Lehmann (1952:106–7) and Ammer (1952) about constraints on the relative aperture of consonants in PIE triconsonantal roots (see above, §1.7). Suffice it to say that if Benveniste and Lejeune are right, and these Greek consonant clusters reflect PIE affricates, these are the very sort of complex segment that should be expected to reflect Pre-IE consonant clusters reduced to single segments at whatever time the second element of the cluster ceased to have allophones in other environments—presumably about the time of syncope. Then Pre-Indo-European did not, after all, necessarily have consistently optimal syllable structure, but very likely did have some consonant clusters, and so what perhaps seemed the least natural aspect of Pre-Indo-European as reconstructed in this work—its typologically extreme syllable structure—can now be recognized as, probably, at least in part an illusion. Many Indo-Europeanists are naturally reluctant to reconstruct monophonematic units like Benveniste's *k^s, simply because the number of such units to be reconstructed multiplies rapidly in the face of correspondences like Gk. δνοφερός, ζοφερός 'dark' : Skt. *kṣáp* 'night' (cf. Szemerényi 1964:401 n. 2); and Gk. χθές, OIr. *in-dē* : Skt. *hyáḥ* 'yesterday'. The variety of such correspondences, however, is not so surprising once it is assumed that historically the sounds in question result from Pre-IE consonant clusters, of which there must have been a considerable variety.

Finally, it remains to discuss what the existence of palatal and labiovelar segments in Proto-Indo-European implies about the structure of Pre-Indo-European. Such segments most commonly result from the effects of neighboring vowels, though the glides /y/ and /w/ can also be the source of the secondary articulation. It is possible then that, for instance, PIE *_k̂_ and *k^w reflect the Pre-IE clusters *_ky_ and *_kw_ (see Hirt 1921–37: 1.228–31), or even *_ty_ and *_tw_, etc.—indeed, if the palatalizing element is *_y_ rather than a vowel, then *_ty_ is statistically a more likely source for PIE *_k̂_ (at first palatalized, then palatal) than *_ky_, since one of the typological conclusions of D. N. S. Bhat (1978:60), after an examination of approximately 120 instances of palatalization in natural languages, is that /y/ 'is more effective on apicals, whereas a following vowel, especially stressed, is more effective on velars.'

The other possibility is that palatalization and labialization are caused by vowels, as, for instance, once again, in Old Irish (and see Szemerényi 1964:401–2). A major difference is that in Old Irish, palatalization and labialization are maintained as secondary articulations, and may be added to almost any consonant (e.g., _t_ may be palatalized or labialized), while in Proto-Indo-European the phenomenon is restricted to the gutturals (meaning that the primary articulation itself has been affected, if consonants other than velars were originally involved). However, the phonological effects encountered in Proto-Indo-European are typologically more frequent than those in Old Irish (Bhat 1978:67), so the disparities in the comparison reflect nothing on the probability that the source of palatalization and labialization in Proto-Indo-European is vowels rather than glides. In fact, typically palatalization more frequently affects a limited subgroup of consonants within the phonological inventories of natural languages. If vowels are the source of the PIE phenomena, were these secondary articulations added at the time of syncope, as in Old Irish? If so, then the PIE trifold guttural series offers the possibility of specifying some Pre-IE vowels more precisely than with the symbol *_a_. However, although syncope seems the obvious occasion for the rise of palatal and labiovelar consonants in the protolanguage, it is not the only possible occasion. It was remarked above (§1.7) that IE root structure was established at a date considerably anterior to syncope. The observation of Lehmann and Ammer that the structure of PIE roots is monosyllabic (i.e., in triconsonantal roots the middle consonant never has smaller aperture than the others) implies a stage of vowel loss anterior to syncope (with subsequent restoration of many vowels before syncope, probably by analogy), since monosyllabic root structure can only have been established at a time when roots did not yet have Pre-IE clitics attached to them. If Lehmann and Ammer's observation is correct, there is no reason the palatals and labiovelars could not have arisen at the time of that earlier vowel loss.

Ultimately I think it likely that PIE palatals and labiovelars result from the effects of vowels rather than from consonant clusters. The incidence of these consonants, for instance, in word-initial position seems rather high to be the result of the consonant clusters *Cy*- and *Cw*-. It also seems unlikely that these consonants were originally all simply velars, since the combined number of incidences of PIE palatals, velars, and labiovelars seems to be considerably higher than the corresponding number of either labials or dentals, and this is true in both the voiced and voiceless series. This is readily demonstrable, in word-initial position at any rate, from the entries in Pokorny's dictionary.

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